AMERICAN JOURNAL OF ORTHODONTICS

OFFICIAL PUBLICATION OF
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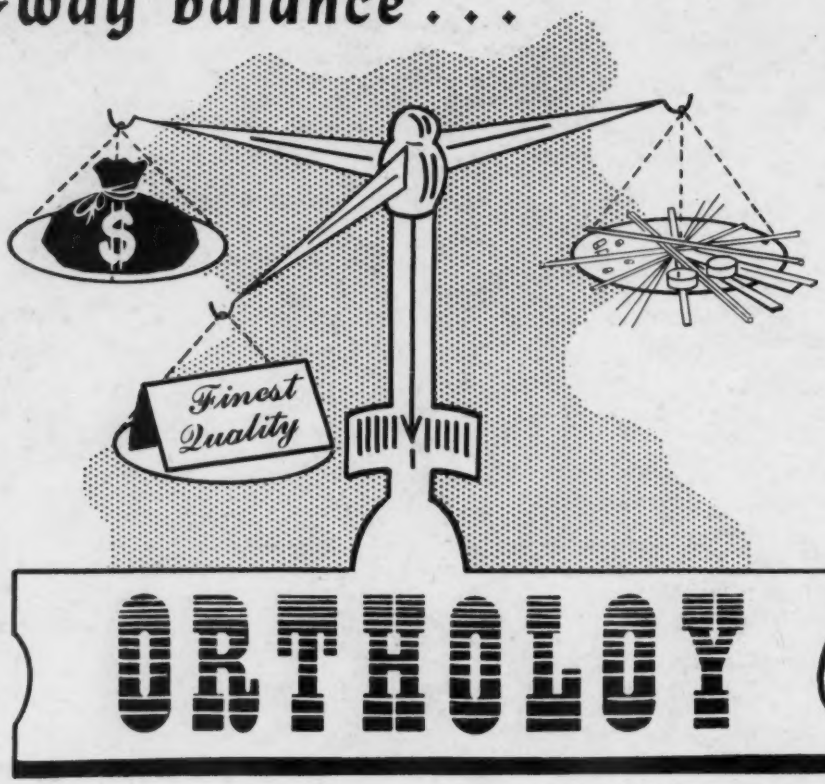
3-way balance . . .



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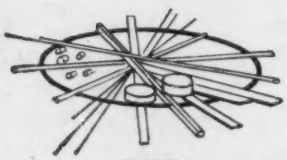

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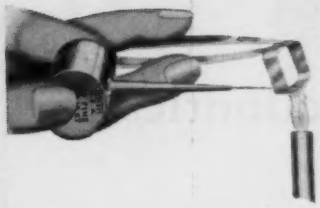

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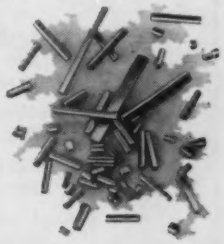

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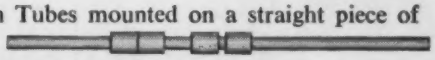
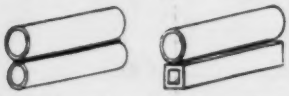
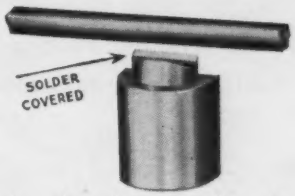


D-SHAPE TUBES AND POSTS COME ON Q-A SEGMENTED WIRE TO FIT.

ALL COMBINATION DOUBLE HEADGEAR TUBES. SAVE CONSIDERABLE TIME.



HALF-ROUND TUBES AND POSTS TUBES HAVE A SHEET OF SOLDER IN PLACE. POSTS ARE GROOVED OUT TO RECEIVE WIRE.



SYMMETRICAL D-SHAPE TUBE AND POST COLLAR SNAPS OVER ARCH WIRE AND IS PLACED IN PERFECT POSTION BEFORE SOLDERING. MADE TO FIT .036, .038, .040 ARCH WIRE.

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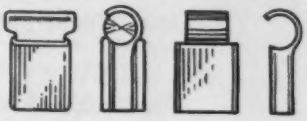

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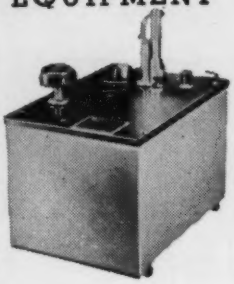

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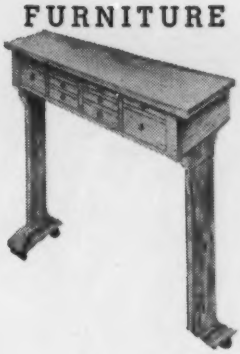

OPERATING AIDS

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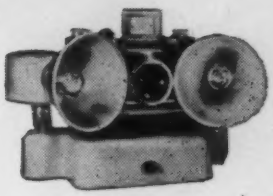

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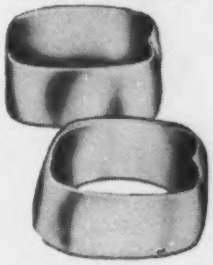

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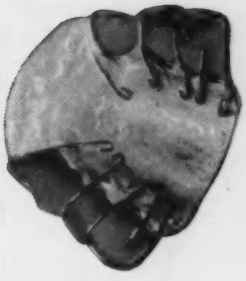

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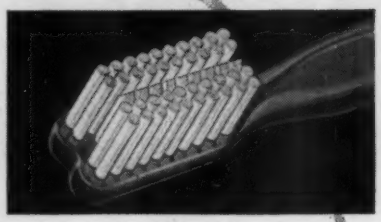

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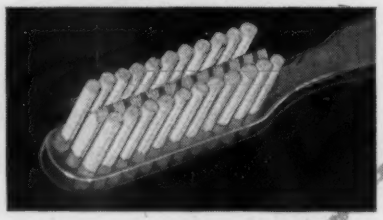

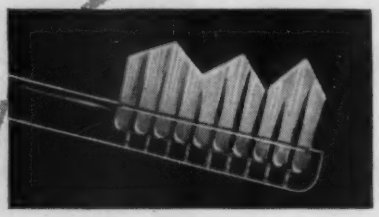

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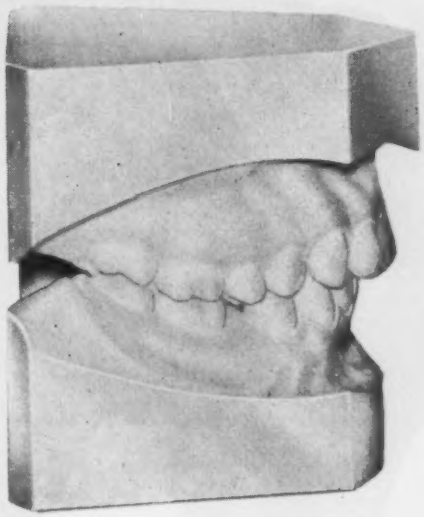

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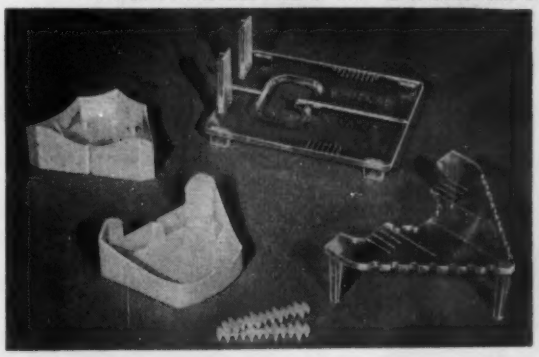

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UB-652 Unichrome Anatomical
Form-Fitting Cuspid Blank

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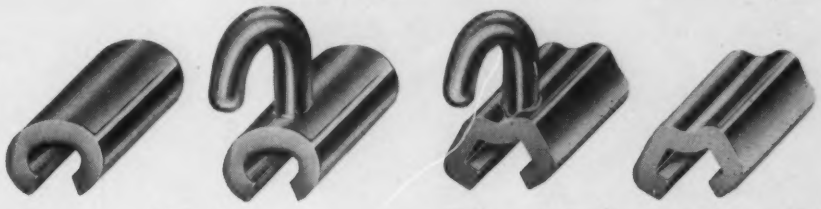
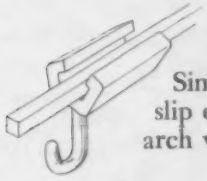
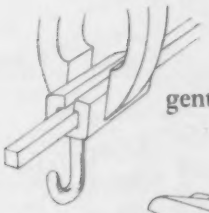


UT-565	Split rectangular stops .022 x .028
UT-566	Split rectangular hooks .022 x .028
UT-580	Split round tubes .022 inside diameter
UT-581	Split round tubes .030 inside diameter
UT-582	Split round tubes .036 inside diameter
UT-583	Split round tubes .040 inside diameter
UT-590	Split round tube hooks .022 inside diameter
UT-591	Split round tube hooks .030 inside diameter
UT-592	Split round tube hooks .036 inside diameter
UT-593	Split round tube hooks .040 inside diameter

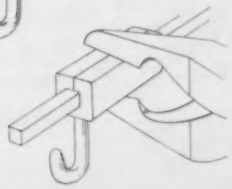
Suggested procedure for using Fogel and Magill Split Tubes and Hooks



Simply slip over arch wire



Close gently with pliers



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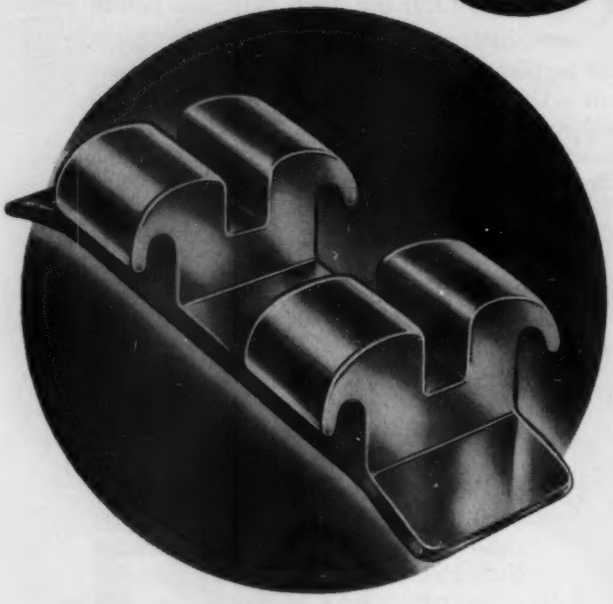

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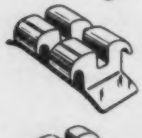

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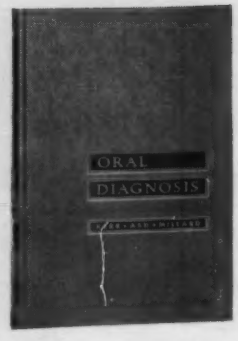

By DONALD A. KERR, D.D.S., M.S., Professor and Head, Department of Oral Pathology and Periodontia; MAJOR M. ASH, JR., D.D.S., M.S., Assistant Professor of Dentistry (Oral Pathology and Periodontia); and H. DEAN MILLARD, D.D.S., M.S., Assistant Professor of Dentistry (Oral Diagnosis). All of the University of Michigan School of Dentistry. Just Published. 1959, 419 pages, 6¾" x 9¾", 212 illustrations. Price, $10.00.

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Original Articles

A LONGITUDINAL STUDY OF SOFT TISSUE FACIAL STRUCTURES AND THEIR PROFILE CHARACTERISTICS, DEFINED IN RELATION TO UNDERLYING SKELETAL STRUCTURES*

J. D. SUBTELNY, D.D.S., M.S., ROCHESTER, N. Y.

INTRODUCTION

DENTAL and orthodontic interest has long been centered on the developing occlusion and the supporting skeletal structures. The eruption pattern of teeth and the skeletal changes in the cranial and facial areas resulting from progressive growth and development have been studied.[1-4]

Cephalometric roentgenography has been employed extensively in this regard, so that growth changes of the head from birth to adulthood in normal and in certain pathologic conditions in living subjects have been defined.[5-10] To date, these investigations have been concerned primarily with the growth and development of the skeletal components of the face as well as the positional relationship of these skeletal parts. As a result of skeletal studies, it is generally accepted that the growth of the human head, although following a somewhat orderly pattern, is very complex with different parts of the head growing at different rates and at different times.

Unquestionably, the differential growth of skeletal components within the total craniofacial complex has an influence on facial appearance which occurs partially as a function of the specific stage of development being considered. As an illustration of this, several investigators[11-13] utilizing serial

*Winner of the Milo Hellman Research Award for 1959.

cephalometric x-rays have presented evidence that the male skeletal profile shows change with growth characterized by an increase in mandibular prognathism with increment in age. Specifically, the chin was found to come progressively farther forward in relation to the upper face, with the result that the skeletal profile becomes straighter or, synonymously, less convex.

In contrast to the above observations pertaining to the skeletal profile, research interest in the integumental or soft tissue characteristics of the profile is comparatively recent in origin and has been concentrated primarily upon cross-sectional evaluations. Perhaps as a partial result of this difference, skeletal profile analyses, as opposed to soft tissue profile analyses, have not always yielded compatible information. For example, in one study it is pointed out that the bony profile of male subjects tends to become less convex with age.[12] In another study, measurements to soft tissue landmarks on a cross-sectional sample resulted in the interpretation that the male face was becoming more convex with age.[14] These results have indicated the advisability of studying skeletal and soft tissue aspects of the profile conjunctively and on a longitudinal basis.

Several investigators have evaluated cross sectionally the relationship of the soft tissue profile to the underlying skeletal profile. Here again, however, controversial opinions have been expressed. As a result of his analysis, one investigator has stressed that the soft tissue profile and the skeletal profile are closely related.[15] Another investigator has suggested that this relationship may not exist because of the variation in the thickness of the soft tissue covering the skeletal face.[16]

The aforementioned comments are not projected as a comprehensive review of the literature. They are intended to represent, selectively, what may be considered current thinking and to define the basis for the present undertaking. There has emerged from this brief review a need to better define soft tissue profile characteristics on a longitudinal basis. Components of the skeletal profile have been found to differ in rate and timing of growth. As a corollary, it might be conjectured that certain components of the soft tissue profile may also show some differences in rate and timing of growth. Thus, a total longitudinal soft tissue profile analysis as well as an analysis of component soft tissue structures would appear to be worthy of concentrated research effort.

In this investigation an attempt has been made to contribute information pertinent to the following questions:

(1) What are the longitudinal characteristics of the soft tissue profile?

(2) Are there differentials in growth associated with different aspects of the soft tissue profile?

(3) If there are differentials in soft tissue growth, how do these affect the configuration of the total profile?

(4) Is the soft tissue profile closely related to the underlying skeletal profile?

METHODS AND MATERIALS

To investigate these areas of inquiry, serial cephalometric roentgenograms obtained from the files of the Charles Bingham Bolton Study of the Face of the Growing Child at Western Reserve University were evaluated. Radiographic records, periodically obtained on thirty subjects from 3 months to 18 years of age, were studied. The sample included an equal number of male and female subjects. All of the subjects presented normal skeletal profiles. There were no cases of abnormal protrusion or retrusion of facial structures in either the maxillary or the mandibular areas.

Serial cephalometric roentgenography as developed by Broadbent[17, 18] has made it possible to study the growth of these thirty subjects on a longitudinal basis. This is possible because the head of the child was positioned within a specially constructed headholder which was set at a fixed distance from an x-ray source. At future dates, the same child was similarly repositioned and additional x-ray records were obtained at varying time intervals. The serial x-ray records were traced. Specifically, these records were the lateral cephalometric roentgenograms taken with the teeth in occlusion. A total of 492 headplates were traced.

Fig. 1.—A typical tracing of a cephalometric headplate depicting the landmarks used in this study. *Ba*, Basion; *S*, sella; *N*, nasion; *PNS*, posterior nasal spine; *ANS*, anterior nasal spine; *A*, point A; *PR*, prosthion; *SN*, subnasale; *NO*, tip of nose; *V*, vermilion border of upper lip; *P*, pogonion; *PS*, soft tissue pogonion; *B*, point B; *If*, infradentale; *VL*, vermilion border of lower lip.

The tracings included the outline of soft tissue structures which constitute a part of the soft tissue profile as well as osseous structures. From each lateral headplate, the nose, the upper and lower lips, the chin, and the soft tissue covering the midsagittal plane of the frontal bone were traced. Cranial landmarks, such as basion, the median point of the anterior margin of foramen magnum, and nasion, the anteriormost point of the junction of the frontal and

nasal bones, were routinely traced. Nasion and basion may be assumed to represent the anterior and posterior limits of the portion of the cranial base to which both the upper and lower face are closely related.

In addition to the cranial base, the conventional osseous landmarks of the upper and lower face were traced. The maxillary and mandibular central incisors as well as the first permanent molars were also traced. A typical tracing, including all landmarks, is presented in Fig. 1.

Changes incident to growth were evaluated by acceptable methods of superimposition and measurement. The techniques of superimposition and measurement will be described preceding the report of specific findings. In certain aspects of this investigation, it seemed advisable to group the longitudinal material so that averages or measures of central tendency could be obtained. For this reason, the data were grouped according to age intervals and according to sex in certain instances. Means were determined for each type of grouping. These averages permitted confirmation of certain observations that were evident in the individual series. Individual longitudinal series are presented when their inclusion facilitated the presentation of longitudinal information. Individual series have also been utilized to clarify some of the variables that were inherent within this sample of longitudinal cases.

TABLE I. MEAN ANGULAR MEASUREMENTS OF MANDIBULAR POSITION

AGE IN YEARS	SKELETAL PROGNATHISM		SOFT TISSUE PROGNATHISM	
	MALE	FEMALE	MALE	FEMALE
½	54.0	57.0	55.5	57.5
1	56.2	57.3	57.5	57.7
2	57.6	59.7	58.1	59.4
3	58.4	59.7	59.1	60.6
4	58.2	60.4	60.0	61.9
5	58.2	60.4	60.3	61.8
6	58.0	60.5	60.1	61.9
7	58.6	60.1	60.0	62.0
8	58.4	60.4	60.5	62.1
9	58.8	60.9	60.8	62.7
10	59.7	61.0	61.5	62.9
11	59.1	61.9	61.1	63.9
12	60.2	61.9	62.4	64.5
13	60.3	62.9	62.2	65.0
14	61.0	62.8	62.8	64.9
15	61.5	62.8	63.6	64.6
16	61.2	62.0	63.2	63.6
17	61.2	62.0	64.2	63.0
18	61.8	62.0	64.0	63.0

PROFILE CHANGES

As previously stated, the primary objective of this investigation was to define the soft tissue profile on a longitudinal basis. In order to do this in a meaningful way, reference to underlying skeletal relationships was necessary. Data describing soft tissue relationships and contours would seem to have little clinical value if they were not presented in reference to skeletal factors. This factor introduces the necessity of reporting respective skeletal and soft tissue measurements in regard to profile changes which occur as a function of growth and development.

Mandibular Position.—The configuration and position of the mandible define the lower aspect of the facial profile. In order to measure mandibular position in a total profile analysis, we need a method which relates its posture to the cranium. For this reason, a modification of the facial angle as projected by Downs[19] was applied in this investigation to objectify the relative degree of protrusion or retrusion of the skeletal chin. The relative anteroposterior position of the skeletal chin was evaluated in reference to the cranial base line, which was defined by a line connecting two skeletal landmarks—basion and nasion. The position of the skeletal chin was determined by reading the angle formed by the cranial base line and a line drawn from nasion to pogonion, the most anterior point of the skeletal chin (Fig. 2).

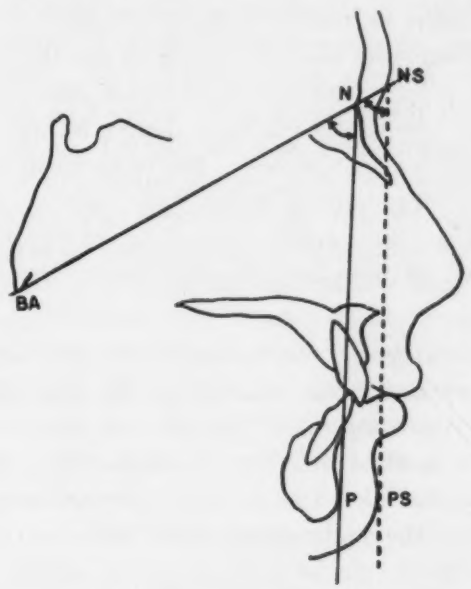

Fig. 2.—Angular method of determining the relative anteroposterior position of the skeletal chin (angle Ba—N—P) and the integumental chin (angle Ba—Ns—Ps) in reference to the cranial base line.

Since the primary focus of this investigation is one of defining soft tissue characteristics of the profile as they relate to the skeletal profile, an adapted soft tissue measurement for the integumental chin was required. This involved continuing the cranial base line anteriorly to intersect the soft tissue profile. The point of intersection was designated as NS (soft tissue nasion). From this point a line was drawn to a point comparable to pogonion, the most anterior point of the soft tissue chin (PS). The angle formed by this line and the cranial base line was measured to indicate the relative anteroposterior position of the integumental chin (Fig. 2). Where the nasal rest of the cephalometric headholder was obviously distorting the soft tissue in the region of nasion, that particular headplate was deleted for measurement purposes. The serial headplates were studied on both a grouped and an individual basis.

Changes in the prognathism of the skeletal chin as a function of growth: The lower aspect of the facial profile tended to become more prognathic with

increment in age. That is, the skeletal chin tended to become more prominent in relation to the cranium with growth. From 6 months of age to 3 to 4 years of age, a marked and rapid increase in mandibular prognathism was apparent. Thereafter, measurements indicate a period of leveling off or little change in the prominence of the skeletal chin until 7 to 8 years of age. After the 7- to 8-year stage of development, mandibular prognathism was observed to increase at a slower but steady rate until late adolescence.

To illustrate these observations with specific measurements, the angular means for the position of the skeletal chin are reported. At 6 months of age, the average degree of mandibular prognathism was found to be 54.0 degrees for the male subjects and 57.0 degrees for the female subjects. By 3 to 4 years of age, the average angle registered a sharper degree of prognathism of 58.4 degrees for the male subjects and 60.4 degrees for the female subjects. However, continued development until the 7- to 8-year stage of maturity was found to be associated with essentially the same degree of mandibular prognathism for both the male and female subjects. By 18 years of age, mandibular prognathism was found to average approximately 62.0 degrees for both groups. Thus, over the latter eleven-year period, from 7 to 18 years of age, a proportionately smaller degree of increased skeletal prognathism was found to occur.

Changes in the prognathism of the integumental chin as a function of growth: Analysis of the measurements related to the prognathism of the integumental chin revealed the following salient characteristics: From 6 months to 4 years of age a marked increase in soft tissue prognathism of approximately 4.5 degrees occurred. The average angle increased from 55.5 degrees to 60.0 degrees for the male group and from 57.5 degrees to 61.9 degrees for the female group.

From 4 years of age to 7 to 8 years of age, no increment in soft tissue prognathism was observed. The increase occurring between the ages of 7 to 8 and 18 years was found to be strongly influenced by sex differentiation. From 7 to 18 years of age the average angle for the male group increased from 60.0 degrees to 64.0 degrees. With some evidence of considerable fluctuation, the average angle for the female group increased from 62.0 degrees at 7 years of age to 63.0 degrees at 18 years of age.

Comparisons between skeletal and soft tissue measurements of mandibular prognathism as a function of growth and as a function of sex: Skeletal and integumental measurements of mandibular position showed that the chin became more prominent with increment in age. That is, with increment in growth, both the skeletal and integumental chins tended to assume a more forward relationship to the cranial base. Soft tissue and skeletal measurements also revealed that the integumental chin closely follows the degree of prognathism of the underlying skeletal framework. The same pattern of change was evident in both the skeletal and soft tissue measurements.

Whereas the comparison of skeletal and soft tissue measurements did not reveal any gross differences, a comparison of mandibular prognathism made on the basis of sex resulted in rather marked differences. Initially (that is, from the sixth month to the 7- to 8-year stage of development), the position of both the skeletal and the integumental chins tended to be more prognathic in the female group than in the male group. Although the girls started out more prognathic than the boys, their measurements of mandibular prognathism at the 18-year stage of development were not found to differ appreciably from comparable measurements for the boys. Therefore, the male subjects showed a greater increment in the degree of mandibular (skeletal and soft tissue) prognathism with increment in age.

This observation implies some degree of difference between the sexes on a longitudinal basis. Average measurements for the boys showed that they expressed approximately one-half of their total increment in mandibular prognathism by the age of 7 years. This was true for the skeletal measurements and, to a greater extent, for the soft tissue measurements. As a corollary, in the male subjects a significant proportion of the total changes occurring in lower face prognathism was expressed at a later age in the preadolescent and adolescent stages of development. In contrast to this characteristic for boys, girls were found to express approximately three-quarters or a greater proportion of their total growth in mandibular prognathism by 7 to 8 years of age and to show little increment after this age.

To specify this observation, it is pointed out that the average measurements for the girls showed only a 1 degree increment in soft tissue prognathism from 7 to 18 years of age. The analogous measurements for the male group showed an average increment equal to 4 degrees. This same trend for male subjects to show a proportionately greater increment in mandibular prognathism during the 7- to 18-year age intervals was revealed by skeletal measurements.

As stated before, the above findings were derived from the analysis of averaged measurements. It should be pointed out that these observations generally were supported by longitudinal analyses of individual series of tracings.

Facial Convexity.—

Convexity of the skeletal profile: The angle of convexity as projected by Downs,[19] is frequently used to specify observations on the skeletal profile. The usefulness of this angular measurement stems largely from the fact that it makes it possible to evaluate the relative anteroposterior position of the upper face to the rest of the craniofacial profile. Specifically, the angle of convexity is determined by measuring the angle nasion—point A—pogonion (Fig. 3, *A*). When this measurement is used in longitudinal evaluations of the profile, an increase in the angle as it approaches 180 degrees indicates a straighter skeletal profile or reduced convexity of the profile. Similarly, a decrease in this angle indicates an increased degree of convexity of the skeletal profile.

Average measurements of the convexity of the skeletal profile at different age levels are presented in Table II. These measurements revealed a rapid decrease in the convexity of the skeletal profile from the earliest age category of 6 months up to the 3-year age category. From 6 months to 3 years of age the average measurements for convexity increased from 160 degrees to 170 degrees for the male subjects and from 160 degrees to 169 degrees for the female subjects. These figures are interpreted as indicating that during these early years of development the forward positioning of the mandible as a function of growth must be proportionately more rapid than the forward growth of the other cranial facial structures.

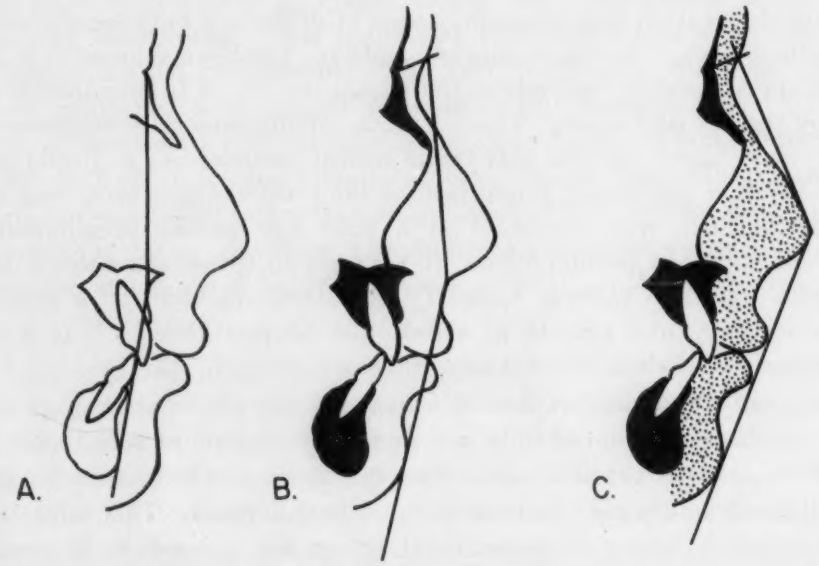

Fig. 3.—Methods of evaluating facial convexity. *A*, Convexity of the skeletal profile (nasion—point A—pogonion). *B*, Soft tissue profile convexity (soft tissue nasion—subnasale—soft tissue pogonion). *C*, Total soft tissue profile convexity, including the nose (soft tissue nasion—tip of nose—soft tissue pogonion).

After 3 years of age the skeletal profile gradually continued to decrease in convexity with increasing age. However, the reduction in the convexity of the profile was found to progress at a much slower rate after the 3-year age level. As an example of the decelerated rate of angular profile change, it is pointed out that from 3 to 9 years of age the average angulation increased 5 degrees. This figure established for a six-year age interval is numerically one-half that of the angular change occurring over the earlier two and one-half-year age interval. By 9 years of age the average angulation was found to be 175 degrees for the male subjects and 174 degrees for the female subjects.

The trend toward decelerated changes in the angular measurements of profile convexity continued beyond the 9-year age group. By the age of 18 years the average angulation reached 177 degrees for the female subjects and 179 degrees for the male subjects. These values approached a "near-straight face" specification or 180 degrees in skeletal profile measurements.

In both sexes the skeletal profile tended to become less convex with increment in age. Perhaps the only point worthy of mention pertains to the mean angulation attained by the age of 18 years. As a group the girls did not quite attain the same degree of straightness in the skeletal profile as did the boys. From 6 months to 18 years of age there was an average increment in the angle (nasion—point A—pogonion) of 19 degrees in the male group and 17 degrees in the female group. In both sexes approximately one-half of this total change was found to take place by the age of 3 years.

TABLE II. AVERAGE MEASUREMENTS OF THE DEGREE OF CONVEXITY OF THE FACIAL PROFILE

AGE IN YEARS	SKELETAL PROFILE CONVEXITY (N-A-P)		SOFT TISSUE CONVEXITY (NS-SN-PS)		TOTAL PROFILE CONVEXITY (NS-NO-PS)	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
½	160.0	160.0	161.0	161.2	138.0	141.2
1	164.2	164.0	161.6	163.7	139.5	142.4
2	167.5	168.9	163.9	165.1	142.5	142.3
3	170.0	169.0	165.0	165.3	142.0	140.9
4	170.3	169.3	163.0	162.9	140.7	139.1
5	170.6	171.6	162.1	164.7	138.5	139.6
6	171.6	170.4	162.2	161.0	138.7	136.8
7	172.9	171.5	161.6	161.1	140.3	135.7
8	173.6	172.6	161.3	161.6	138.4	135.6
9	175.0	174.2	161.6	162.4	138.7	134.9
10	174.7	173.3	160.6	161.1	137.4	133.7
11	175.9	174.1	162.1	160.4	137.6	132.8
12	174.8	175.3	161.8	160.7	137.3	132.8
13	174.9	175.1	162.1	161.9	136.2	132.1
14	178.4	175.5	161.4	161.0	134.3	129.7
15	176.3	176.6	161.0	162.3	134.0	130.9
16	176.4	177.4	161.2	162.9	132.0	131.3
17	179.5	177.3	163.7	160.5	136.0	129.3
18	179.0	177.0	163.5	163.3	133.0	131.0

The results of these skeletal measurements permit the generalization that during this entire growth span (6 months to 18 years), the maxillary denture base tended to become less and less prominent in relation to the rest of the skeletal profile with increment in age. Although the direction of change in the convexity of the skeletal profile was consistent, there was no evidence of uniform, linear increments with advancing age. In contrast to a smooth curve, increasing proportionately from infancy to 18 years of age, the longitudinal measurements showed changes occurring at different rates. This finding indicates that the different parts constituting the skeletal facial profile must have been growing at different rates and at different times. In all but one series, the definite tendency for the skeletal profile to become less convex with growth was evident. In the excepted series (one of the female subjects), the angle of convexity was not found to change appreciably from early childhood to early adulthood.

Convexity of the soft tissue profile: Two methods were employed to evaluate changes in the convexity of the soft tissue profile. The first measurement was designed to focus upon soft tissue structures which were closely

analogous to the structures utilized for measuring the degree of convexity of the skeletal profiles. The second method of measuring soft tissue profile convexity was devised so that the nose could be included in the measurements of facial convexity. This was required because the nose has a marked and sometimes indirect influence upon the total cosmesis of the soft tissue profile. Despite a recognition of this fact, the nose has received little attention in previous longitudinal studies of the profile.

The first method of measurement involved measuring the angle (soft tissue nasion—subnasion—soft tissue pogonion). These points are illustrated in Fig. 3, *B*. The second method of measurement including the nose, involved measuring the angle (soft tissue nasion—tip of nose—soft tissue pogonion). An illustration of this measurement is included in Fig. 3, *C*.

Soft tissue measurements of profile convexity (NS—subnasion—PS): Measurements of the convexity of the soft tissue profile, excluding the nose, were found to decrease in the degree of convexity or to become straighter with age until the age of approximately 3 years. In both sexes the angle changed from an average of 161 degrees at 6 months of age to an average of 165 degrees by 3 years of age. From 3 to 6 years of age, there appeared a reversal in the trend toward a reduction in the convexity of the soft tissue profile. A slight increment in the convexity of the soft tissue profile was found in the 3- to 6-year age interval. By 6 years of age the average angulation was found to approximate closely the mean established at 6 months of age—161 degrees for female subjects and 162 degrees for male subjects.

From 6 to 18 years of age little change was observed in the average convexity of the soft tissue profile. Analysis of the averaged angular measurements for the convexity of the soft tissue profile revealed that some fluctuations in measurements did appear, but the average angulation tended to maintain itself at the level observed at the 6-year age category or to become slightly more convex with progressing age. As was previously pointed out the average measurements for the 6-year age level closely approximated the average angular measurements for the 6-month age level. It can be generalized on the basis of these averaged angular measurements for soft tissue profile convexity that the convexity of the soft tissue face changes minimally from 6 months to 18 years of age when such measurements exclude an appraisal of the nose.

These observations derived from averaged measurements for various age intervals were supported by the analyses of individual longitudinal series. In a few cases, the soft tissue profile becomes slightly straighter or less convex by 18 years of age. However, these changes, when they were observed, were very small and did not exceed a magnitude of 1 to 3 degrees.

Soft tissue measurements of total profile convexity including the nose (soft tissue nasion—tip of nose—soft tissue pogonion): Angular measurements of the convexity of the soft tissue profile which included the nose in evaluation and angular soft tissue measurements which excluded the nose showed the same trend in the earlier age groups. The average angle increased or tended

to become less convex up to the 3-year stage of development. Once again, this observation is explained by the rapid increase in skeletal mandibular prognathism reported to occur during this age span. Since skeletal prognathism and soft tissue prognathism of the chin were found to be closely related, rapid increases in skeletal prognathism would serve to bring the integumental chin rapidly forward during the early period of development.

Both methods of evaluating the convexity of the soft tissue profile showed increased facial convexity after 3 years of age. However, a marked difference between the two methods of measurement appeared in regard to the degree or extent of increase in soft tissue convexity. A minimal increase in convexity from 3 to 18 years of age (approximately 4 degrees) was revealed in the measurements which excluded the nose. The small increase which did occur was found to take place during the 3- to 6-year age interval. Analysis of the measurements that included the nose revealed a marked and continued increase in the convexity of the soft tissue profile with increment in age. That is, when the position of the tip of the nose was taken into consideration, facial convexity increased as the average angulation changed from 142 degrees at 3 years of age to 133 degrees at 18 years of age in male subjects and from 141 degrees to 131 degrees during the same age span in female subjects. These figures, established for an age range extending from 3 to 18 years of age, indicate that the change in the angle (NS—tip of nose—PS) equalled approximately 10 degrees. This angular change was considerably greater than the 4 degree increment in facial convexity established for the soft tissue measurements which excluded the nose in angular evaluation.

This finding is interpreted as evidence that the forward growth of the nose is greater in proportion than the forward growth of the other soft tissue structures of the face. In conclusion, it is also pointed out that there appeared no well-defined sex differentiations in regard to the evaluations of the convexity of the soft tissue profile.

Comparison of skeletal and soft tissue profile convexity: The results relative to changes in the convexity of the bony profile support the findings of other investigators.[11-13] As stated, the skeletal profile tended to become less convex with age. A longitudinal consideration of the progression toward a straightening of the skeletal profile revealed that the changes occurred most rapidly during the early years of life but continued in the same direction of change until early adulthood.

The analysis of the convexity of the total soft tissue profile, including the nose, revealed considerable changes which occurred in the opposite direction to the changes observed for the bony profile. Instead of the straightening phenomenon which was characteristic of the skeletal profile, the soft tissue total profile was found to increase in convexity with progression in growth and development. Once again, these changes were found to occur most rapidly in the earlier stages of development but continued to express a consistent pattern and direction of change on up into early adulthood.

In contrast to these findings that the skeletal and total soft tissue profiles progress through opposing patterns of change, the average angular measurements of the soft tissue profile, exclusive of the nose, tended to remain relatively stable. Minimal changes were observed to occur at the early stages of development, but little alteration in the average angular relationship was found to take place after 6 years of age.

The stability revealed by the angular measurements to soft tissue landmarks which were closely analogous to underlying skeletal points of reference seems of considerable importance. It might be reasonable to assume that soft tissue points directly overlying skeletal points would reflect the same pattern of change as that revealed in the analysis of the bony profile. With regard to mandibular prognathism, this supposition was supported in that the measurements to the integumental chin closely followed skeletal measurements of the lower face. When soft tissue landmarks in the region of the upper face were utilized, however, longitudinal changes were not analogous to those manifested by underlying skeletal points.

Fig. 4.—The thickness of soft tissue covering the skeletal profile. *1*, The soft tissue covering nasion, as measured from N to Ns along the extended cranial base line. *2*, The thickness of the soft tissue overlying point A. This dimension was measured from point A along a line maintained parallel to the palatal plane. *3*, The thickness of the soft tissue overlying pogonion. The dimension from P to Ps was measured along a line maintained parallel to the palatal plane. Where necessary, a perpendicular was dropped from soft tissue pogonion to the line extending from pogonion.

In order to investigate further the relationships between soft tissue and skeletal structures in the upper face, additional measurements were needed for the thickness of the soft tissue covering the various skeletal points which were used to describe the angular convexity of the profile. The methods of measurement are illustrated in Fig. 4.

Changes in the thickness of the soft tissue covering the profile: In almost all instances the average thickness of soft tissue overlying bony nasion was slightly greater in males than in females. In both sexes the thickness of tissue

tended to remain constant or to decrease slightly with age (Table III). To specify this tendency, averaged measurements for the 3- and 18-year age levels were found to be 10.2 mm. and 10.0 mm., respectively, in boys and 9.7 mm. and 9.0 mm. in girls. These findings indicate that the soft tissue covering bony nasion shows negligible change in dimension with increasing age.

From 3 to 18 years of age, the average thickness of soft tissue overlying bony point A increased from 12.2 to 17.5 mm. in boys and from 10.7 to 15.5 mm. in girls. Thus, the average increase in thickness overlying bony point A was approximately 5 mm. for both sexes. This 5 mm. increment in average thickness of the soft tissue overlying bony point A was considerably greater than the soft tissue change occurring at nasion.

The increase in soft tissue thickness overlying bony pogonion was found to be less than the increase occurring at point A. On the average, boys showed a small but definite increase from 10 to 12.4 mm. in thickness over pogonion from 3 to 18 years of age. During the comparable age span the average thickness increased slightly less in girls (from 10.1 to 11.1 mm.).

TABLE III. AVERAGE SOFT TISSUE THICKNESS IN MILLIMETERS

AGE IN YEARS	SOFT TISSUE THICKNESS OVERLYING NASION		SOFT TISSUE THICKNESS OVERLYING POINT A		SOFT TISSUE THICKNESS OVERLYING POGONION	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
1	11.2	11.0	9.8	9.0	9.0	9.0
3	10.2	9.7	12.2	10.7	10.0	10.1
6	9.9	9.0	12.7	11.3	11.0	10.0
9	9.5	8.0	14.0	12.6	10.5	10.2
12	10.0	7.5	15.0	14.0	11.0	10.5
15	10.0	7.6	16.1	15.1	12.0	11.0
18	10.0	9.0	17.5	15.5	12.4	11.1

Compositely, these averaged measurements indicate that the soft tissue drape is about equally distributed in thickness (10 mm.) over midsagittal bony structures at 3 years of age. Measurements at 18 years of age, however, show that the degree of increase in soft tissue thickness is not equal for all segments of the profile. As indicated, the increase in soft tissue over point A is proportionately greater than the increase over pogonion and proportionately much greater than the increase over nasion.

In summary, it is pointed out that, with growth, changes take place in the dimension of the soft tissue covering the skeletal profile. These changes in the thickness of the soft tissue covering midsagittal bony structures can effect the configuration of the facial profile. Comparatively, there was greater increment in thickness of soft tissue covering the maxillary region than was found in soft tissue covering the areas of nasion and pogonion. Considering this the soft tissue profile tends to change in the direction of increase rather than decrease in facial convexity. This can partially explain why the soft tissue profile, when the nose is excluded in the analysis, does not tend to become progressively less convex as does the underlying skeletal profile with increment in age.

Changes in the Component Parts of the Soft Tissue Profile.—

The nose and its foundation: Since the soft tissue profile measurements which included the nose showed a trend toward greater convexity, further study of the nose itself was indicated. A line was projected from the tip of the nose (the most anteroinferior point of the midsagittal profile of the nose) to nasion (Fig. 5, *A*). Linear measurements of this line provided data on the length of the nose. Measurements were secured for each subject at 1, 3, 6, 9, 12, 15, and 18 years of age.

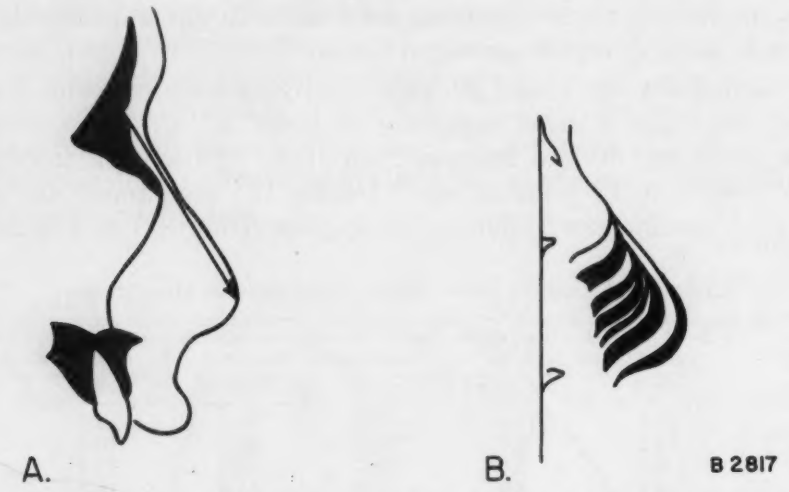

Fig. 5.—Evaluation of changes in the profile of the nose. *A*, Line projected from nasion to the tip of the nose for measurement purposes. This indicated the extent of downward and forward growth of the nose. *B*, Superimposed tracings of an individual series. The tracings are superimposed on a line connecting nasion and point A, registering on nasion. This depicts the growth pattern of the nose of an individual subject.

The degree of increase in nose length from 1 to 18 years of age was approximately the same in male and female subjects. Total increments were found to average 26.1 mm. for the boys and 27.0 mm. for the girls. However, a difference between boys and girls was noted in that the average nasal length in boys was greater at all age levels than that observed for the female subjects. Nose length increased from an average of 34.1 mm. at 1 year of age to an average of 60.2 mm. by 18 years of age in the male group. In the female group this dimension increased from 30.8 mm. to 57.8 mm. during the same age span. As shown by the averaged figures in Table IV, each three-year interval was found to have an associated increment of 3 to 5 mm. in nasal length. This increment was somewhat unusual in the sense that it was found to be just as characteristic of later stages of development as it was of the early stages. Thus, these measurements of downward and forward growth of the nose from 1 to 18 years of age did not reveal a decrease in rate of change with increment in age, as is fairly typical of growth patterns established for skeletal facial structures.

In both sexes the increment in the vertical dimension of the nose was much greater, with growth, than the average increment in the anteroposterior or horizontal dimension of the nose. The presentation of the anteroposterior and

vertical measurements does not seem to be necessary within the scope of this writing. However, they are presented in Table IV. For present purposes, emphasis is given to the observation that the tip of the nose is progressively attaining a more forward and downward position with increased age.

Averages established for the dimension between the nose tip and nasion indicated that there was a consistent and steady increment in downward and forward growth of the nose with progression in time. This finding in relation to a consistent and steady increment required considerable modification as a result of superimpositioning of respective male and female longitudinal tracings. Each series was analyzed by superimposing the tracings on a nasal base line (nasion to point A) registering on nasion (Fig. 5, *B*). Through this procedure, changes in the position and contour of the external nose were revealed.

In male subjects certain stages of development were found to be characterized by greater growth increments than other stages. In twelve of the fifteen male cases there was a spurt of growth occurring between 10 and 16 years of age If an average age for the growth spurt is desired, it can be stated that it generally seemed to center around 13 to 14 years. However, it was observed as early as 10 years of age in some cases and as late as 15 to 16 years of age in other cases.

TABLE IV. MEAN MEASUREMENTS OF THE NOSE IN MILLIMETERS

AGE IN YEARS	NOSE LENGTH (NASION TO TIP OF NOSE)		VERTICAL HEIGHT OF NOSE		ANTEROPOSTERIOR LENGTH OF NOSE	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
1	34.1	30.8	28.1	25.0	19.5	18.0
3	38.9	37.0	32.0	30.1	21.6	21.4
6	43.3	41.1	36.0	34.2	24.0	23.1
9	47.7	45.2	40.1	37.0	26.1	26.0
12	51.7	50.2	43.5	41.1	28.1	29.4
15	54.9	54.4	46.6	44.3	29.0	32.2
18	60.2	57.8	49.0	46.1	35.2	35.0

A growth spurt was evident in only three of the fifteen female cases. In the three girls it was observed to center around 12 years of age, or at an earlier stage of development than in the boys and to be of much smaller increment than was evident within the male group. In both the male and the female series, after the age of growth spurt, the nose was observed to continue in its growth, although the degree of increment seemed reduced. Generally, it was observed that the total profile of the nose was closely related to the path of growth of the nasal bone. In subjects whose total growth pattern did not show spurt characteristics, the configuration of the profile of the nose seemed to maintain itself with progressing age. That is, the bridge of the nose and the cartilaginous aspect of the nose seemed to maintain contour conformity from age to age.

In the majority of boys and in a few girls when a growth spurt was evident there were some concomitant changes in the relationship of the nasal

bone to the cranium. The change can be described as a tendency for the nasal bone to deviate from its downward and forward path of growth and to project or become inclined in a more forward direction. In these instances, there was frequently a concomitant manifestation of a hump or elevation in the profile of the bridge of the nose. This elevation of the bridge would be less apparent if there was a comparable and associated forward positioning of the more inferior aspect of the nasal profile. For example, if the nasal bone swung forward and the cartilaginous aspect of the nose swung forward to a comparable degree, the prominence of the nasal bone would be minimized. It should be stated that, as a rule, the path of growth of the soft tissue nose seemed to be related to the path of growth of the nasal bone.

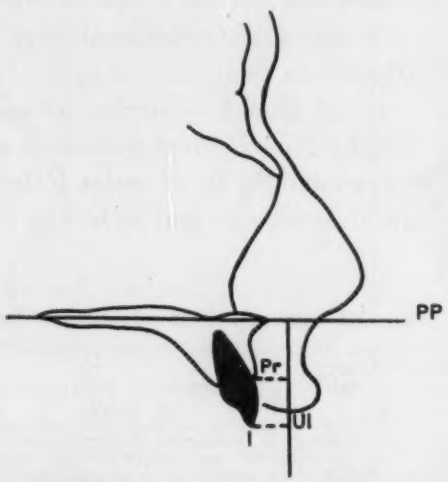

Fig. 6.—Method of analysis of the upper lip. From the most inferior point of the upper lip (*UL*), a line was drawn perpendicular to the palatal plane (*PP*). Lines were drawn from prosthion (*Pr*) and the incisal edge of the central incisor (*I*), which were maintained parallel to the palatal plane. The dimension from *UL* to the points of intersection were measured along the line perpendicular to the palatal plane.

In summary, it is pointed out that the soft tissue nose continues to grow in a downward and forward direction from 1 to 18 years of age. This is compatible with the finding that the total soft tissue profile increases in convexity with increment in age. Serial superimpositions revealed appreciable differences in the contour of the nose when spurts of growth were evident. These changes in nasal contour when they occurred tended to have an important influence on the total facial profile.

The lips and the denture: In continuing the analysis of the component parts of the soft tissue facial complex, the upper and lower lips and their associated positions in relation to contiguous structures were studied. Thus, the soft tissue components overlying the dentoalveolar complex were studied definitively.

The upper lip: To facilitate the analysis of the upper lip, the palatal plane was drawn on each tracing connecting the landmarks, anterior nasal spine and posterior nasal spine. From the most inferior point of the upper lip, a second

line was drawn perpendicular to the palatal plane (Fig. 6). The linear dimension from the inferiormost point of the lip to the palatal plane, representing the vertical length of the upper lip, was measured and recorded for each age interval. No difference was found between the male and female subjects relative to this measurement; therefore, the two samples were combined into one group.

The average length of the upper lip was found to be 18.53 mm. at 1 year of age. By 18 years of age this dimension was found to have increased to an average of 25.0 mm. This increment in upper lip length from 1 year to 18 years of age equaled approximately 6.5 mm. The average dimensions for the upper lip at various age levels are presented in Table V.

By comparing consecutive, averaged measurements for the various age intervals, the general pattern of change with increment in age is indicated. The upper lip was found to show rapid increment in length from approximately 1 to 3 years of age. Further increment in length was observed from 3 to 6 years of age; however, during the latter three-year interval, the rate of increment seeemed markedly reduced. After 6 years of age, the average growth curve once again showed an upswing, with the increment in length occurring at about the same rate as was evident from 1 to 3 years of age.

TABLE V. AVERAGE VERTICAL MEASUREMENTS OF THE UPPER AND LOWER LIPS AND THEIR POSITION RELATIVE TO UNDERLYING STRUCTURES

	MAXILLARY LIP				MANDIBULAR LIP		
AGE IN YEARS	UPPER LIP LENGTH (MM.)	TIP OF UPPER LIP TO PROSTHION (MM.)	TIP OF UPPER LIP TO INCISAL EDGE (MM.)	PER CENT OF INCISAL CROWN COVERED BY THE UPPER LIP	LOWER LIP LENGTH (MM.)	TIP OF LOWER LIP TO INFRA-DENTALE (MM.)	TIP OF LOWER LIP SUPERIOR TO INCISAL EDGE (MM.)
1	18.53	6.4	0	100	16.8	8.1	3.0
3	19.8	5.2	2.3	70	18.5	8.8	3.3
6	20.5	5.66	2.9	66	20.8	10.6	4.3
9	22.0	7.76	4.0	66	22.2	13.2	3.6
12	23.0	7.6	4.4	63	23.3	13.3	4.0
15	24.3	7.5	4.7	61	24.6	13.6	4.3
18	25.0	8.0	4.0	67	25.0	14.0	4.7

A progressive increase in length continued to be reflected by measurements until the age of 15 years. Thereafter, growth in length seemed to slow down appreciably. To generalize, it can be said that the average growth curve for the upper lip seemed to stimulate, to a degree, the growth curve projected by Scammon and colleagues[20] for muscle and other connective tissue.

Average measurements for the vertical growth of the upper lip and for the vertical growth of the nose were compared. This showed that during analogous age intervals the nose increased in length much more rapidly and to a greater extent than did the upper lip. Thus, as would be anticipated, the marked increase in the vertical height of the upper face is accounted for principally by nasal growth, with an associated and proportionately smaller increase taking place in the vertical length of the upper lip.

In addition to the averaged measurements, superimposing methods were employed to evaluate the sequence of changes occurring in the upper lip. Tracings for each series were superimposed on the palatal plane, registering on the anterior nasal spine. In general, the results of superimposing individual series confirmed the observations noted from the averaged data relative to lip length. However, the superimpositions contributed other significant information. It was observed that in both sexes the upper lip usually tended to attain a proportionately greater thickness in the vermilion region than in the region overlying point A. The increase in thickness at the vermilion level was approximately equal to the increase in length. This observation appears somewhat surprising, since the increase in length is perhaps more commonly recognized and the increase in thickness is much less obvious. In both the male and female subjects the upper lip was observed to increase in thickness from 1 to 14 years of age. After 14 years of age, male subjects continued to show an increase in thickness of the upper lip. In contradistinction to this, the upper lip did not become discernibly thicker in the female subjects after 14 to 15 years of age.

The posture of the upper lip in its vertical relationship to dentoalveolar structures: In view of the fact that the alveolar bone, as well as the lip, increases in vertical dimension with growth, additional measurements were indicated. In order to define the vertical posture of the upper lip in relation to underlying structures, measurements were made from the tip of the lip to a landmark approaching the crest of the maxillary alveolar bone (prosthion) and from the tip of the lip to the incisal edges of the maxillary central incisors. Prosthion was selected as the point from which measurements should be made because it is visualized on the lateral headplate as the point of intersection of the maxillary labial alveolar plate with that of the labial surface of the crown of the maxillary central incisor. Prosthion, closely approximating the crest of the maxillary alveolar bone in the anterior region, could be expected to increase in its distance from the denture base as a function of vertical alveolar growth.

The dimension from prosthion to the tip of the upper lip was found to increase from 3 years to approximately 9 years of age, or until after the approximate time of full eruption of the upper central incisors. Specifically, the dimension increased from an average of 5.2 mm. at 3 years of age to an average of 7.76 mm. at 9 years of age. After 9 years of age, the linear relationship between prosthion and the tip of the lip seemed to approach stabilization.

Thus, the upper lip may be said to maintain a fairly constant vertical relationship to the alveolar crest after the time of full eruption of the maxillary central incisors. This permits the postulation that after 9 years of age vertical growth of the upper lip tends to keep pace with alveolar growth in the maxillary region, or vice versa. In order for prosthion to maintain a constant relationship to the inferior border of the upper lip after 9 years of age, further alveolar and lip growth must be occurring at nearly comparable rates.

If it is true that the inferior border of the maxillary lip maintains a fairly constant relationship to prosthion, the question arises as to whether it maintains an equally constant relationship to the incisal edge of the upper central incisors. To objectify the relationship between the tip of the upper lip and the incisal edge of the maxillary central incisors, measurements were made and are presented in Table V. Analysis of the averaged measurements for the various age groups showed that during the early years the upper lip is frequently below or inferior to the level of the incisal edge. After 3 years of age, it is almost consistently superior to the incisal edge of the deciduous central incisors until the time approaches for the eruption of the permanent incisors. With the eruption of permanent teeth and the concomitant growth of the surrounding alveolar process, the upper lip continues to assume a more superior position relative to the incisal edges of these teeth until approximately 9 years of age. After the complete eruption of the maxillary central incisors, the upper lip was found to maintain a fairly constant relationship to the incisal edges. Specifically, the incisal edge was found to be about 4.0 to 4.5 mm. inferior to the tip of the upper lip.

As an adjunct to measuring the dimension between the incisal edge and the tip of the lip, the average percentages of the maxillary central incisor crown that was covered by the maxillary lip were determined. After 6 to 9 years of age (that is, after the full eruption of the maxillary permanent incisors) the percentage of crown coverage by the upper lip was found to be fairly constant. After 9 years of age, an average of 61 to 67 per cent of the maxillary central incisor crown (passing from the cervical margin toward the incisal edge) was found to be covered by the upper lip.

To summarize the measurements from the tip of the upper lip to various skeletal landmarks, it can be said that the upper lip gradually increases in length as a function of growth and development. In contrast, the vertical relationships between the tip of the lip and prosthion and between the tip of the lip and the incisal edge of the central incisors were found to be fairly constant after 9 years of age or after the full eruption of the upper central incisors. In one of the succeeding sections the anteroposterior posture of the upper lip will be discussed in conjunction with the lower lip posture.

The lower lip: Longitudinal changes in the vertical dimensions of the lower lip were defined by measurements to skeletal landmarks. The methods used and the measurements derived are analogous to those secured and reported in reference to the upper lip.

To facilitate measurements, a perpendicular line (lower lip line) was drawn from the superiormost point of the lower lip to the mandibular plane. Other lines were drawn perpendicular to the lower lip line (Fig. 7). Vertical measurements of the length of the lower lip were determined by measuring, along the lower lip line, the dimension from the superiormost point of the lower lip to the level of point B. No sex differences were noted, so the cases were combined and compositely analyzed. The results of these and other measurements of the lower lip are presented in Table V.

As indicated by the averaged data, the length of the lower lip was found to increase from 16.8 mm. at 1 year of age to 20.9 mm. at 6 years of age. After 6 years of age, the lower lip measurements continued to increase, but at a slower rate than that shown during the first six years of life. The slower rate of increase in vertical height was found to exist until approximately 15 years of age, when measurements leveled off with little discernible increment occurring between 15 and 18 years of age. In regard to this latter observation, a marked similarity is shown between measurements secured for the upper and lower lips. By 18 years of age, the lower lip length was found to have increased to an average of 25.0 mm., indicating an average increment from 1 to 18 years of age of 8.2 mm. During this time span, the lower lip increased more in length (an average of 1.7 mm.) than did the upper lip.

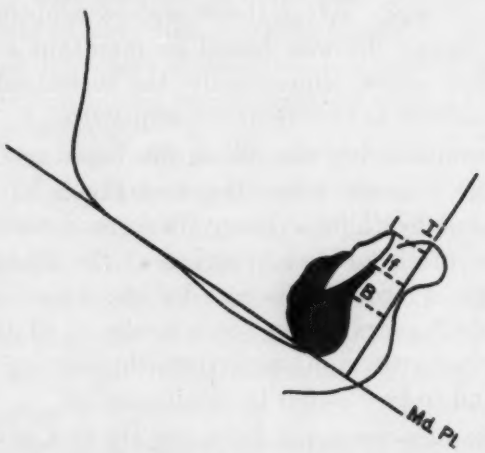

Fig. 7.—Method of analysis of the lower lip. A line (lower lip line) was drawn from the superiormost point of the lower lip (*IL*), perpendicularly, to the mandibular plane (*Md. Pl.*). Other lines were drawn perpendicular to the lower lip line. These included perpendiculars constructed from the incisal edge of the mandibular central incisors (*I*), from the landmark infradentale (*If*), and from point B. Measurements were made from the superior point of the lip to the various points of intersection.

Tracings of individual series were superimposed to evaluate changes in thickness. It was evident that the lower lip increases in thickness considerably more in the vermilion region than in the region overlying skeletal pogonion and skeletal point B. In this regard, measurements in the vermilion region were closely similar to the comparable measurements noted for the upper lip. From 1 to 18 years of age, measurements from the anteriormost point of the vermilion border of the lower lip showed an average increase of 7 mm. for the male subjects and 6 mm. for the female subjects.

Vertical relationship of the lower lip to underlying dentoalveolar structures: Measurements between the upper lip and prosthion revealed a fairly stable relationship after 9 years of age. To determine whether a comparably stable relationship existed between the lower lip and its underlying alveolar process, measurements analogous to those employed for the upper lip were applied. The dimension from the superiormost point of the lower lip to the

level of the landmark, infradentale, was measured at all age levels. Infradentale in the lower arch is analogous to the anatomic position of prosthion in the maxillary arch.

The dimension from infradentale to the superior margin of the lower lip was found to continue to increase until approximately 9 years of age. Specifically, this dimension increased from an average of 8.8 mm. at 3 years of age to an average of 13.2 mm. at 9 years of age. These measurements from the superior margin of the mandibular alveolus indicate that the lower lip was increasing in length at a faster rate than the mandibular alveolar process during this time span. This resulted in the superior margin of the lower lip increasing in its superior relationship to the crest of the mandibular alveolar process.

After the complete eruption of the lower permanent incisors (that is, after 9 years of age), the superior aspect of the lower lip was found to maintain a comparatively stable relationship to infradentale. An average dimensional increase of only 1 mm. was noted from 9 to 18 years of age. The vertical relationship between infradentale and the lower lip after the age of 9 years showed the same stability as that revealed by measurements from prosthion and the upper lip. Thus, it can be generalized that both lips show a fairly constant vertical relationship to their respective underlying alveolar processes after 9 years of age.

Similarly, measurements of the relationship between the lower lip and the incisal edges of the mandibular central incisors again showed essentially the same result as that revealed by the analogous measurements of the relationship of the upper lip and the maxillary central incisors. During the time of exfoliation of deciduous incisors and the active eruption of the lower permanent incisors, the relationships between the lip and the incisors tended to vary. However, after the full eruption of the mandibular central incisors (that is, after approximately 9 years of age) there was very little dimensional change in relationship.

It was observed that the lower lip covers the incisal third of the maxillary central incisors. When the teeth were in occlusion and the lips were approximated, it had been observed that the maxillary lip, on the average, covered 61 to 67 per cent of the crown of the maxillary central incisor. On the average, the lower lip was found to cover the remaining 33 to 39 per cent of the maxillary central incisor crowns, that is, the incisal third of these teeth.

The Anteroposterior Postural Relationships Between the Lips and Underlying Structures.—The longitudinal series were studied individually to evaluate changing positional relationships of the lips and the dentoalveolar complex relative to the facial profile. Changes in the dentoalveolar area of the mandible were determined by superimposing each tracing on the facial plane (nasion-pogonion), registering on pogonion. To study changes in the maxillary region, the tracings were again superimposed on the facial plane, but this time registering on nasion. It is acknowledged that the facial plane is modified in position by increases in mandibular prognathism. It seemed to be a usable or functional plane, however, since interest was centered on changes relative to the profile.

In a majority of cases, it was observed that in the mandibular region the labial alveolar plate and the lower incisors tended to approach the facial plane to a greater degree with increment in age. In other words, there seemed to be an uprighting of the mandibular alveolar process and incisors (Fig. 8). In some instances this uprighting resulted in the alveolar plate and mandibular incisors assuming a position lingual to the facial plane. The mandibular alveolar process, including the area of point B, obviously was becoming more retruded in relation to its underlying supporting bone, the chin. This phenomenon was observed to occur in twenty-five of the thirty longitudinal series. In three of the remaining five cases there seemed to be little change in the position of the mandibular alveolar process and incisors relative to the facial plane. In the other two cases the lower incisors were observed to become more protrusive in relation to the facial plane with increment in age.

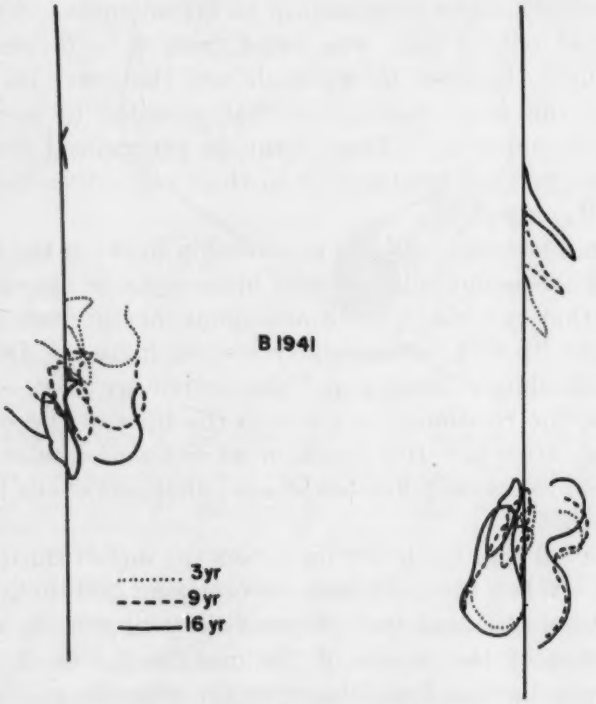

Fig. 8.—Superimpositions of the tracings of the same subject at three different age levels illustrating the uprighting and recession of the central incisor and alveolar process relative to the facial plane. Note the lip posture.

Generally, with growth, the maxillary central incisor and alveolar process also tended to become more closely related in position to the facial plane. In many instances, the maxillary central incisor crown was found to lie on the facial plane by 18 years of age. Thus, the maxillary denture also was found to become less protrusive relative to the profile. This occurrence may have been anticipated in the maxillary region because of the increase in skeletal mandibular prognathism and the decrease in bony profile convexity with growth.

In all cases, the vermilion aspect of the lips tended to maintain a fairly stable postural relationship to the underlying teeth and alveolar process. When the lower denture was observed to become upright and to approach the facial plane, the lower lip was also observed to become more retruded relative to the facial profile. In those instances in which the denture became more protrusive in relation to the facial plane, the lips also maintained a protrusiveness in relation to the facial profile (Fig. 9). This was revealed by superimpositions of the vermilion aspects of the lower lip. This portion of the lip showed the same directional modification as that revealed by the mandibular alveolar process and teeth. These observations were equally applicable to changes occurring in the maxillary region. On the basis of these superimpositions, it can be stated generally that the anteroposterior position of the vermilion region of the lips is closely related to underlying structures—the teeth and alveolar processes.

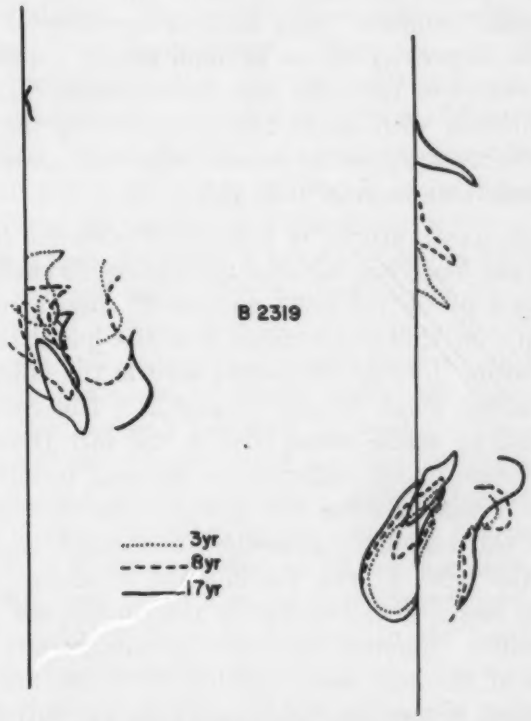

Fig. 9.—Superimpositions of the tracings of the same subject at three different age levels illustrating an increasingly protrusive denture relative to the facial plane. Note the protrusive lip posture relative to the facial plane.

DISCUSSION

At the present time orthodontic diagnosis and treatment planning are influenced to a great extent by existing concepts of the changes that will occur in the skeletal face with increment in growth and development. The emphasis upon skeletal changes has certainly been justified and the abundance of pertinent information relative to the facial skeleton which has been gathered

through years of cephalometric and experimental studies of growth has been of tremendous value to the orthodontist. Undoubtedly since skeletal tissue serves as the foundation over which soft tissue is draped, it will largely determine what transitional changes will take place in the facial profile from infancy to adulthood.

To a degree, clinical dependence upon evaluation of the skeletal profile has been encouraged by the concept that soft tissue components directly reflect underlying skeletal components. It must be remembered, however, that many structural elements enter into the configuration of the face—cartilage, connective tissue, and musculature as well as bony tissue. Any developmental changes in the soft tissue overlying the skeletal parts, in itself, may influence facial appearance. The composite results of this study indicate that all parts of the soft tissue profile do not directly follow the underlying skeletal profile. It is true that certain areas of the face do show a strong tendency to follow skeletal changes directly, but other areas were found to diverge in soft tissue contour from underlying skeletal structures. It is pointed out that the convexity of the skeletal profile tended to decrease with age while the convexity of the total soft tissue profile including nasal structures tended to increase with age. The convexity of the soft tissue profile excluding nasal structures tended to remain relatively stable, showing changes of minimal magnitude with increment in age.

If the external nasal profile is completely deleted from consideration, there still remains the basic finding that the analogous skeletal and soft tissue landmarks failed to indicate the same pattern of change in profile convexity. A natural follow-up on this observation was the quantitative evaluation of the soft tissue covering the skeletal points used in the analysis of profile convexity, that is, nasion, point A, and pogonion. The results supported the finding of increased or stable convexity in the soft tissue profile angle as opposed to the decrease in convexity of the skeletal profile. Specifically, the soft tissue increment with growth was found to be minimal in the region of nasion, greater in the region of pogonion, and much greater in the region of point A. On the basis of this finding, the tendency for the soft tissue facial convexity to increase in relation to the underlying skeletal configuration is comprehensible. Compositely, these results permit the generalization that the thickness of the soft tissue related to the middle third of the face was found to increase proportionately more than the soft tissue covering the lower face.

In addition to angular evaluations of the profile and measurements of soft tissue thickness over specified skeletal points, soft tissue components of the profile (upper lip, lower lip, and nose) were quantitatively and qualitatively appraised on a longitudinal basis. This latter aspect of study revealed that the soft tissue components situated in the upper facial region (above the level of the maxillary denture and alveolar process) did not reflect underlying skeletal changes. The nose and soft tissue over point A were found to show progressively increased anterior prominence. In contrast to this, the

soft tissue components in the lower facial region (inferior to the level of the maxillary denture base) were observed to reflect modifications in the underlying skeleton and denture. The integumental chin and the vermilion areas of the lips were closely related to the skeletal chin and the dentoalveolar processes. To illustrate, the skeletal and integumental chins were observed to become more prominent, in a related fashion, with increasing mandibular prognathism concomitant with increment in age. In the mandibular region the soft tissue profile was closely related to the underlying skeletal profile. This relationship also was observed when soft tissue contours overlying the denture were examined. With the increment in mandibular prognathism, there was a concomitant recession and uprighting of the denture in relation to the profile. This was especially true after 12 years of age. The anterior teeth and their alveolar processes were observed to fall back in relation to the facial plane, which progressively moves forward with increase in mandibular prognathism. Associated with the receding and uprighting denture relative to the skeletal foundation, the respective lips also were receding and uprighting in relation to the facial plane. Thus, the soft tissue overlying the denture tended to maintain a close postural relationship to the dentoalveolar complex. This was true in vertical as well as horizontal relationships.

In summary then, it can be said that the denture itself, because of its retrusion and uprighting, is not stable in relation to its skeletal base. Similarly, the soft tissue overlying the denture is not stable in relation to the skeletal base of the denture, but it does maintain a relatively stable horizontal and vertical relationship to the denture itself after approximately 12 years of age. With these factors in mind, it seems reasonable to hypothesize that the uprighting of the alveolar process and incisors may result from stable functional relationships between denture and muscular forces, which may become fully established before complete skeletal growth has been expressed. Thus, a continuing increase in the downward and forward growth of the maxilla and mandible would tend to create somewhat more protrusive skeletal bases for the dentition. Since the degree of growth expressed in the mandible has been found to exceed that occurring in the maxilla, as evidenced by a straightening in the convexity of the skeletal profile, one might suggest that the uprighting of the alveolar plate and denture would be more pronounced in the lower arch than in the upper arch. This suggestion was supported by subjective comparisons between the angular inclinations of upper and lower incisors and anterior alveolar plates.

Orthodontic interest is focused on the skeletal and soft tissue relationships in the region of the mouth. In this longitudinal study, the data show that the dentoalveolar and lip aspects of the "mouth profile" are interrelated. This is important since at least one of these elements is modifiable by the orthodontist. Orthodontic intervention may establish satisfactory anterior dental relationships; thus by an accompanying change in the posture of the lips and/or by a change in the muscular function and balance in the lips, a more desirable "mouth profile" may be attained.

Other factors also operate to cause changes in the posture of the mouth profile relative to contiguous soft tissue structures. The integumental chin was observed to assume a more forward relationship to the lower lip during the later stages of growth. At the same time, the forward positioning of the tip of the nose was greater than that of the soft tissue chin. The more rapid and disproportionate forward repositioning of the nose tip and chin adds to the impression that the lips are receding within the total facial profile. Thus, the inclusion of nasal structures in a profile analysis seems to merit some serious consideration. Although it may be suggested justifiably that the nose has no influence upon the conventional profile evaluation the impact of nasal contour upon the total facial profile scarcely can be contested. In the present article, considerable effort has been expended in defining some of the changes in nasal contour associated with growth. These have been included to provide a clearer definition of total profile changes which might be anticipated by the clinical orthodontist who is endeavoring to modify the mouth profile in a manner which will augment total facial balance and harmony.

SUMMARY

The primary objective of this study was to define the soft tissue profile on a longitudinal basis. An attempt was made to determine whether the soft tissue profile was closely related to the underlying skeletal profile. For the purposes of this study serial cephalometric radiographs obtained on thirty subjects from 3 months to 18 years of age were traced and studied. Changes incident to growth were evaluated by acceptable methods of superimposition and measurement.

With growth, both the skeletal and integumental chins assumed a more forward relationship to the cranium. The integumental chin tended to be closely related to the degree of prognathism of the underlying skeletal framework. The bony facial profile tended to become less convex with age. Rather than the decrease in facial convexity which was characteristic of the skeletal profile, the total soft tissue profile (including the external nose) was found to increase in convexity with progression in growth. The soft tissue profile, excluding the nose from profile analysis, showed a tendency to remain relatively stable in its degree of convexity. In this regard, the soft tissue changes were not analogous to those manifested by the skeletal profile.

It was pointed out that, with growth, changes take place in the dimension of the soft tissue covering the bony profile. These changes can have some effect on the configuration of the facial profile. It also was demonstrated that the soft tissue nose continues to grow in a downward and forward direction from 1 to 18 years of age. The disproportionate rate of growth of the nose explains the finding that the total soft tissue profile increases in convexity with increment in age.

The upper and lower lips were found to increase in length as a function of growth. After the full eruption of the maxillary central incisors, the upper lip was found to maintain a fairly constant vertical relationship to prosthion and the incisal edge of the central incisors. Similarly, the lower

lip showed the same relative stability in its vertical relationship to infradentale and the incisal edge of the mandibular central incisors. It can be generalized that both lips showed a fairly constant vertical relationship to their underlying alveolar processes and anterior teeth. The anteroposterior posture of the lips also was found to be closely related to the teeth and alveolar processes. In general, it was observed that the labial alveolar plates and central incisor teeth tended to recede and upright relative to the facial plane with increment in age. The vermilion aspect of the lips, especially of the lower lip, was concomitantly observed to become more retruded in relation to the facial profile. Thus, it may be generalized that lip posture is closely related to underlying structures, the teeth and alveolar processes.

The composite results of this study indicate that all parts of the soft tissue profile do not directly follow the underlying skeletal profile. Some areas were found to diverge in soft tissue contour from underlying skeletal structures, while other areas showed a strong tendency to follow skeletal changes directly.

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EASTMAN DENTAL DISPENSARY.

HYPNOSIS IN ORTHODONTICS

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IN THIS article I shall offer some ideas which I have utilized in the successful management of children in an orthodontic practice. Hypnosis can be of immeasurable value when problems arise, such as gagging when impressions or x-ray pictures are being taken or when removable appliances are being worn. Hypnosis may also be used to assist in conquering oral habits in patients where no basic emotional problem exists, to overcome the use of chewing gum or sticky candies, and to elicit cooperation in every respect necessary for the successful correction of a malocclusion. Whenever possible, conscious suggestions are employed, but in stubborn or difficult situations hypnosis is utilized.

I want to emphasize the fact that hypnotic procedures are not employed as a daily routine. I will indicate situations in which the utilization of hypnosis is indicated in our specialty. It is significant that one who has been indoctrinated in the value of hypnosis in practice finds a diminished need for its use. On the other hand, patients who are exposed to the environment of practitioners completely trained in hypnosis are more relaxed, more cooperative, and happier. There is a better dentist-patient relationship; this leads to cooperation and is an important factor in the management of orthodontic patients. In addition to trying to obtain a satisfactory result, the orthodontist also has to contend with interference with progressive treatment by such factors as broken and postponed appointments, problems of oral cleanliness, repairs of orthodontic appliances, and recementation of bands loosened by chewing gum and sticky candy. A survey[1] of sixteen patients during 967 office visits showed that 35 per cent of the appointment time was taken up with repairing or cleaning rather than progressive work. As also reported previously,[2] lack of cooperation was an obstacle in treatment of malocclusion.

While orthodontics is considered a biomechanical science, one must realize that the behavioral aspects of the patient and of the orthodontist are of equal importance. Many children lose interest after commencing treatment and come unwillingly or not at all for continued treatment. They find that at first the orthodontist puts on a "big splash" and makes a grandstand play to ingratiate himself. After that he assumes his normal role, which often may be detached and which may manifest itself in harsh management of the patient. A hypnosis-oriented orthodontist usually is well adjusted. He is trained in

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basic fundamental psychology and has learned the importance of a proper doctor-patient relationship. Rapport is established on a permanent basis, and the orthodontist is well trained in masking his own deep emotional problems so that they will not be reflected in the relationship with his patients.

The branch of dentistry most amenable to the utilization of hypnosis is orthodontics. The factors that render the patients more cooperative are motivation and age. While the dentist is concerned with preserving the economy and longevity of the dentition, the child patient is more concerned with ego satisfaction in improving his looks and in competing with other children in the wearing of braces. The threat of being called "Bugs Bunny" or "Buck Tooth" has a tremendous impact on the child's personality; this leads to a cooperative relationship between the patient and the orthodontist. There is no parallel between the child patient in the dentist's office and the child patient in the office of the orthodontist. Unfortunately, in the past the dentist was often referred to as a "bogey man" in attempts to calm badly behaved children. Also, there was an unfortunate impact on the mind of the child who heard weird tales of pain and suffering in the dental office when parents or older children discussed their experiences. It is my pleasure to state that in the past decade the dentist has adopted a psychological approach in the management of dental patients, showing kindness and understanding which have contributed much to alleviate the morbid situation of fear. Children today love their pedodontist and look forward with glee and happiness to the next dental appointment. Can it be the gifts which are offered or the television, movies, or perhaps histrionics of the cheerful dentist that encourages their future visits?

The successful use of hypnosis in any discipline depends on several factors. Prominent among them is the attitude of the practitioner. If he feels sincerely and deeply that he can help his patient with hypnosis, then and only then is he in a position to administer a successful hypnotic induction. The orthodontist must be calm and relaxed with his patients. He must handle them with tender, loving care that reflects warmth, sincerity, and kindness.

Children have an intuitive feeling when they observe the orthodontist's attitude, and they will immediately decide whether they are going to like or dislike him. Children have preconceived ideas based on hearsay regarding some of the unpleasant experiences with the orthodontist.

Our approach is rather a simple one. The patient is made the center of attraction. Guided courtesy and attention are focused on the parent, but the child is the most important individual. The children usually make the decision as to which orthodontist will straighten their teeth. Hence, attention has to be directed to the child. Many practitioners put on a grandstand performance for the parents and talk in language that is over the heads of the children. Instead of using simple words, they use the jargon spoken at erudite dental meetings.

Semantics is an important part of the armamentarium for establishing the patient-practitioner relationship. Hence, before anything is done for the patient and before any instruments are employed for measuring, the patient

should be enlightened as to what the practitioner is about to do. The explanation should be given in positive and simple words. The impact of harsh words may trigger emotional reactions which will interfere with the smooth performance of services at that and future visits. Gentle and kind indoctrination will aid immeasurably in obtaining cooperation and successful orthodontic results.

The procedure that I am about to describe is used with all patients. At the first visit after consultation, after there is acceptance of the arrangements, I proceed as follows:

"I am going to take some x-rays of your teeth. I will place this paper in your mouth and you will relax while the picture is being taken." I use a film holder which facilitates the handling of the film. If I find that the patient reacts by retching or gagging, I will say: "Let me show you how *you* can overcome this yourself. This is a way to help; it is a game of imagination. Hold your arms out as I do; clasp your fingers together. Now I want you to imagine the things you say to yourself to appear as a picture on a screen behind here. [Point to hairline in the center of the forehead. With older patients it is referred to as the mind's eye.] Repeat after me as you clasp your fingers tighter and tighter together: 'I have a feeling that my fingers are getting tighter and tighter together. They feel so tight—so, so tight—that I feel they are glued so tight that even if I want to take them apart now, I cannot. No matter how hard I try, I cannot take them apart. Now I try to take them apart, and I cannot take them apart. The harder I try, the more difficult it will be for me to take them apart. Now, I stop trying.'" The last command is given as soon as I notice some catalepsy or even mechanical locking, and also if I notice that the patient can readily unclasp his fingers. I then say, "Now I can take my fingers apart." While many authorities on hypnosis consider this procedure a method of suggestibility, I can continue into eye-closure technique and then arm catalepsy and trance induction when I am desirous of a trance state. However, I will stop at the separation of the fingers after the hand-clasp technique and say: "Were you able to take your fingers apart?" The answer invariably is "No." Some older children say that they could have if they had wanted to. Then I say: "I did not hold your hands; you did it yourself just with your own mind [pointing to patient's forehead]. Now you can stop what you are doing. [Notice that I do not refer to nausea, gagging, or retching.] When I put this in your mouth just relax, breathe in and out nicely, and breathe faster to feel better."

Invariably, this technique suffices to overcome retching and gagging when impressions or x-ray pictures are being taken. If the patient does not respond to the above-described technique, trance induction is pursued until the patient is hypnotized. Then posthypnotic suggestions are given to negate the retching or gagging.

The management of circumoral habits is one that requires intensive study. If there is an emotional problem which is deeply rooted, then psychological guidance by a competently trained therapist should be suggested to the parent.

Our approach usually depends upon proper rapport and conscious discussion of the problem with the patient in relation to his or her ego importance. Invariably, when no problem exists and there is no need for substitute displacement, children will be most cooperative. They listen very attentively and are more prone to cooperate rather than be dunned by the parent. The orthodontist makes them feel important, and they invariably respond because he has made them important. On the other hand, children will say: "I try, but I cannot help myself." It is at this time that hypnosis is introduced by the technique previously described or by any technique with which the orthodontist is familiar. Posthypnotic suggestions that the patient stop tampering with appliances, chewing gum, or eating sticky candies are made. For the thumb- or finger-sucking habits, we use a strip of ½ inch adhesive tape. First, we consciously establish the need for a willingness to overcome a sucking habit. Once a motive has been established, a suggestion is made to wrap ½-inch tape lightly around the finger. Then the child is asked about the significance of the red traffic light. He will say that it means "stop." We then say: "Suppose you put a big red dot on the tape to remind you not to put your finger in your mouth." The response to this procedure is amazingly rapid. On the other hand, if the child persists in the habit (not on an emotional basis) then posthypnotic suggestions of negative olfactory responses can be employed.

The practitioner may consider this too time-consuming. I know that writing this has taken more time than the management of the most uncooperative patient I have handled in over thirty-five years of orthodontic practice. One has to consider that progress in these situations is retarded in 35 per cent of our orthodontic patients.

CONCLUSION

The practitioner who is competently trained in hypnosis will find that there is a diminished need for the use of hypnosis per se with most of his patients. His understanding of psychodynamics will aid immeasurably in establishing rapport with his patients and help him develop an excellent patient-orthodontist relationship. His vocabulary will consist of positive words which will not trigger negative reactions in his patients. As a rule, the orthodontist who has been exposed to hypnosis indoctrination usually displays kindness and understanding and treats his patients with tender, loving care.

The highest achievement in an orthodontist-patient relationship is attained when the parent says: "You know, Doctor, I would almost think that you had hypnotized my daughter when I see how nicely she cooperates." The same holds true for doctor-patient relationships in the other healing disciplines in situations in which trance induction is not utilized.

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THE ACTIVATOR'S MODE OF ACTION

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INTRODUCTION

THE activator and its use in orthodontics have been much discussed in German-speaking countries for the past twenty years. The use of this apparatus was propagated by Andresen and Häupl in their teaching of functional jaw orthopedics. From 1953 to 1956 there followed my discussions regarding the theory, that is, the mode of action, of this instrument.[2-6]

THE ACTIVATOR

The activator, which was named by Andresen and Häupl, is almost identical with the monobloc constructed by Robin fifty years ago. It consists of a plastic plate, as thick as the usual prosthetic device. According to therapeutic requirements, wire devices can be attached to this plastic plate (labial arch, guide wires for teeth, etc.). The plate may be divided into two or more sections, which are connected by one or more regulating screw devices or a Coffin spring (Figs. 1 and 2). The plastic plate furthermore consists of tooth-guiding impressions for the upper and lower teeth with their adjacent alveolar processes, both portions being joined by a connecting rod of the same plastic material. First, each tooth surface has its own original impression, made according to the plaster cast. Second, these impressions are modified by the orthodontist to allow for guiding surfaces and to create expansion room for the teeth. The plastic plate seems to be alike for all cases, but the special configuration of both dentition-guiding impressions varies according to the individual patient's occlusion. In order to obtain the therapeutically effective relationship of the lower teeth to the upper teeth, a special construction bite ("working bite") in wax is made in order to cast the plastic connecting rod. For the construction bite, generally the therapeutic desired position of the lower jaw is chosen. That is, in the case of a Class II (Angle) malocclusion, the mandible's position will be changed and held in a Class I position by the activator. It is possible to achieve this effect by several steps. At the beginning the activator often is not set to full compensation from the Class II to the Class I position of the mandible but is set only partway; after positive therapeutic reaction, the activator then should be changed and the bite taken nearer to Class I position. On the other hand, the apparatus may be constructed in overcompensation, accomplishing a position nearer to Class III. Then care must be taken not to achieve this Class III position; the use of the apparatus must be stopped at the correct time. When the construction bite is

taken in the actual centric rest position of the mandible, without deviation in any direction, notwithstanding a pre-existing Class I, II, or III occlusion, one gets the "actual bite activator." However, this centric-related activator is practically never used except in Class I cases.

Eccentric activators can be constructed in fore-bite, back-bite, side-bite, and in combinations. As a result, we have Class II or Class III activators, as far as the necessities of the therapy of the different cases are concerned. Different authors give for the vertical dimension of the connecting rod distances between 2 and 7 mm. measured at the first molar. According to the teachings of functional jaw orthopedics, the activator should be used only as a passive apparatus, that is, it should not produce any power but should only receive and further

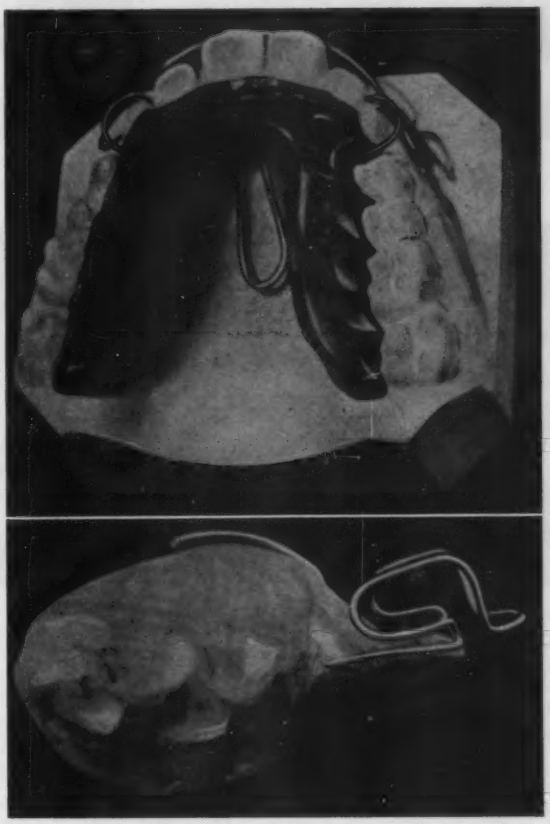
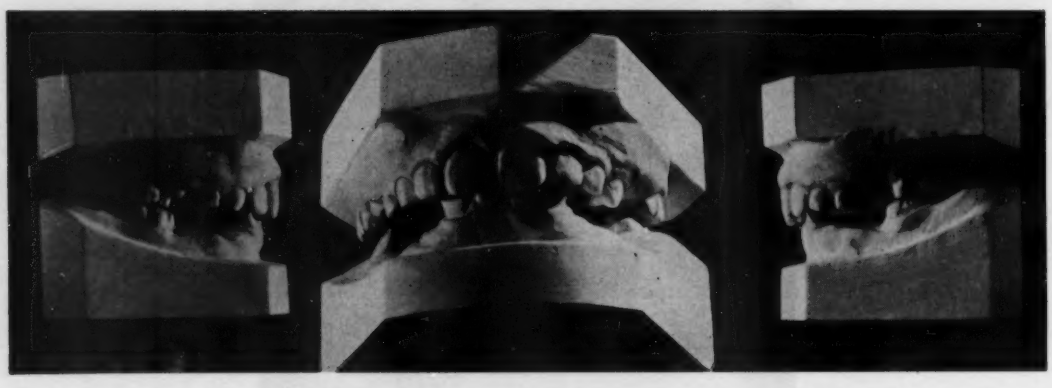


Fig. 1.—Activator. (From Andresen, Häupl, and Petrik: Funktionskieferorthopaedie, ed. 6, München, 1949, Johann Ambrosius Barth.)

transport power from the functional milieu to the teeth. In keeping with this, it is set loosely in the mouth, so that when the mouth is opened wide it falls on the mandible, if applied to the upper jaw. It is not clamped intramaxillarily. It would be possible, naturally, using the built-in springs and screws, to produce artificial powers, but then, according to Andresen and Häupl, the apparatus would become an active regulating device and would no longer have its loose setting; intramaxillary clamping would be the result. The springs and

screws are used only according to the method of Andresen and Häupl for stepwise regulation of the guiding surfaces *after* the functional powers have produced their effect. In the present discussion of Häupl's theory, only these passive modes of action are viewed. Therefore, no opinion will be ventured as to the possibilities of the practical use of the device as an active apparatus.

A.



B.

Fig. 2.—Angle Class II malocclusion with deep bite in 9-year-old boy treated for eleven months with activator. Therapy as modified by author. Eleven visits were necessary. (From Herren, P.: Zur Praxis des Aktivators, *Schweiz. Monatschr. Zahn.* 65: 213, 1955.)

THE ACTIVATOR'S MODE OF ACTION ACCORDING TO EARLIER AUTHORS

The indications given by the different authors are not very clear. The activator is usually worn at night. Robin[10] thought that its efficiency was due to active movements of the mandible, as they are produced in masticatory function; furthermore, he also used the activator for the artificial application of power. Watry[11, 12] recommended the use of this apparatus for the stimulation, support, guidance, and development of functional strengths. He named the muscles of mastication as the sources of power. Artificial strength would have to be used only if natural forces would not be sufficient. Functional jaw orthopedics, which was later recommended by Andresen and Häupl, is based on a similar foundation. Due to the passive activator, a raised activity of the masticating muscles is claimed; this may be recognized by the intermittent

movements of the apparatus. The teeth would be given continuous jolts, causing vibration which, in turn, would shake the periodontal tissues. The foregoing alone would transmit adequate stimuli for the tissue rebuilding, the moving apparatus (and never the resting one) being the causative factor and the musculature being the only source of stimulation. The apparatus itself, not being clamped between the teeth, would exert no pressure. Pressure could never cause any orthodontic tissue rebuilding; it needs the intermittent mode of action, that is, "many short single impulses."

Häupl proves his point with histologic experiments, but his report lacks a systematic analysis of the functional milieu of the activator, as well as observations on the patient wearing the apparatus during sleep. Häupl makes a sharp distinction between functional jaw orthopedics and classical orthodontic therapy. He contends that the first one is the only biologic orthodontic therapy. Eschler[13, 14] later tried to support Andresen and Häupl's theory of functional jaw orthopedics by muscle-phsiologic experiments. He took the leads of the action currents of the masticating muscles of sleeping children, comparing them in turn with and without activators and using activators of different construction. Occasionally leads were taken between a crowned tooth and the activator which at each contact caused a little lamp to light up. Eschler found larger action currents from the patients wearing the activator as compared with those not wearing any apparatus. He believed that the lighting of the lamp was synchronous with the action current spikes of the muscles. This he took as proof of the correctness of Andresen's and Häupl's theory.

Opposed to this, A. M. Schwarz[15] stressed the theory of the effect of the pressure produced by active biting (pressing) of the jaws. In addition to this, there was also lighter pressure of a few grams exerted by the weight of the tongue and the activator. The mandible may be held in out-thrust rest position by the apparatus and occasionally supported by the pillow. During sleep the jaws would remain at rest but in pressing action, except for short interruptions. The few jolts are thought to be unimportant. On the other hand, the pressure derived from tetanic processes in the muscles, would exert rapidly increasing and decreasing pressure effects on the tissue (''Micro-intermittence''). Schwarz also holds this to be true for each active regulating apparatus. Each orthodontic device, because of the vibrations in the mouth, would cause a type of ''quaking'' of the tissues, which would extend to the nearby structures.

One night Schwarz set an activator in a child's mouth. At each jaw closing an electric lamp was caused to flash. There were noted 120 contact changes. Once a contact lasted continuously for four hours. Schwarz recognizes no principal difference between active orthodontic treatment and the method of Andresen and Häupl.[9]

THE MODE OF ACTION OF THE ACTIVATOR ACCORDING TO THE AUTHOR'S POINT OF VIEW

The so-called "mode of action" means only the immediate influence of the functional milieu on the behavior of the apparatus and vice versa; therefore, the

microscopic and macroscopic changes as a following reaction in the tissue, as well as the later changes in the functional behavior of the masticating organ and the site of growth, will not be included here. The following theory of the mode of action is based on many years of therapeutic experience with the activator, analytic studies of the functional milieu, and observations on patients during sleep. A good idea of the mode of action is necessary for diagnosis and for elimination of failures in the practical use of the activator. It is the basis of the theory of functional jaw orthopedics.

The Functional Milieu Without Set-in Activator.—By "functional milieu" is meant the sum of all possible movements and rest positions of the masticatory organ and its environment as well as their nerve action during the time the apparatus is worn.

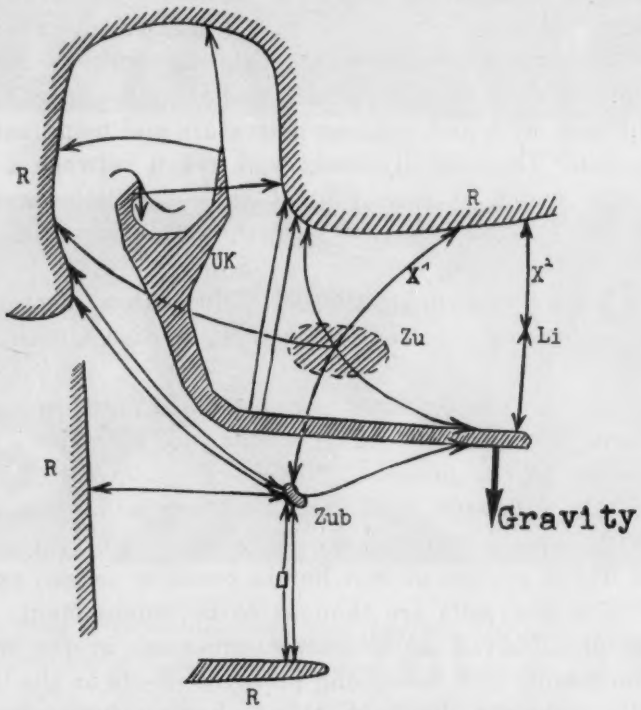
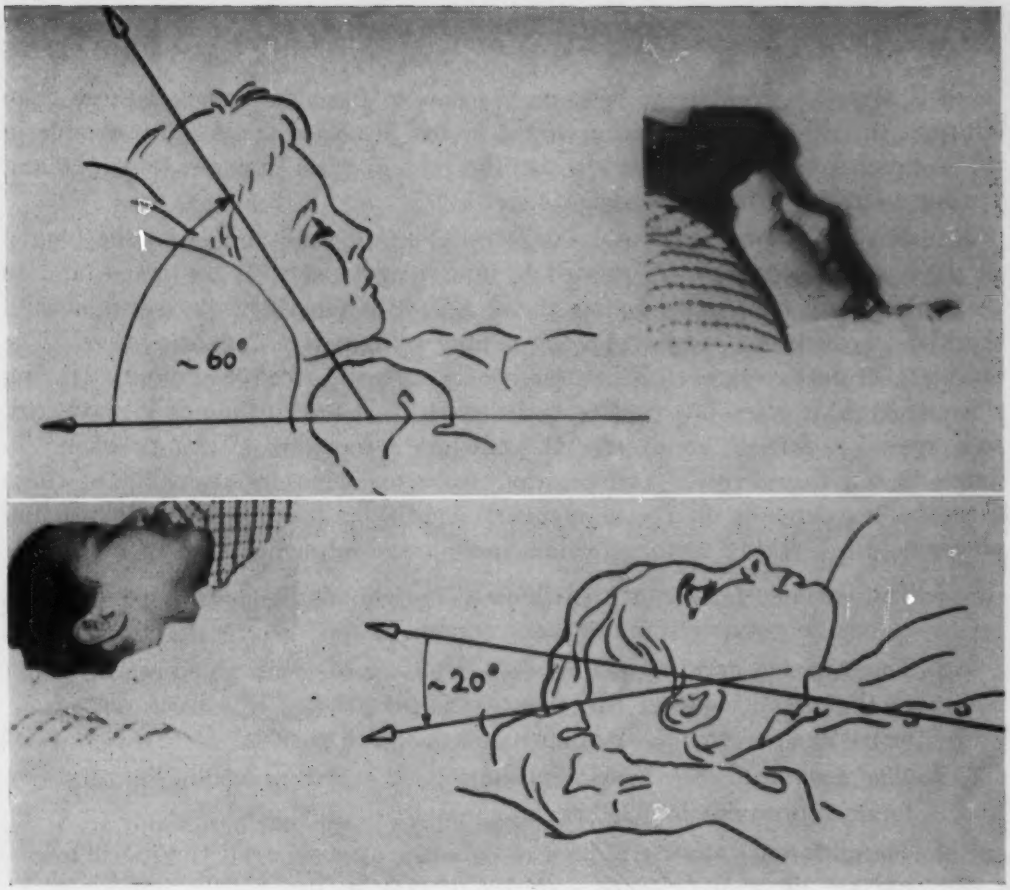


Fig. 3.—Reciprocally balanced position of lower jaw, tongue, lips, and hyoids in motile frame (*R*); closed form of rest position. Suspended in frame *R* are motile skeleton parts—lower jaw (*UK*) and hyoid (*Zub*)—and soft part consisting of muscular body of tongue (*Zu*). Muscle bands connect these parts with each other and with frame. With open-mouth position two medial suspension bands $X^1 + X^2$ of *UK* are not existent; *Zu* and *UK* descend. The Tensioning system of *Zu* and *UK* changes, and indirectly the system of *Zub* also changes. (From Herren, P.: Die passive Haltung und Bewegung des unterkiefers, *Schweiz. Monatschr. Zahn.* **63**: 561, 1953.)

The masticatory organ can be considered as a more or less closed biologic system, according to Salzmann (1948). It is enclosed by a frame, made up of several movable parts: the base of the skull, the vertebral columns, and the upper part of the thorax. The entire system is incorporated in the body by this frame (Fig. 3). The configuration of the different parts of the frame is variable in three dimensions (due to different head flexions and head torsions). It is determined in particular by the powers working from outside, although



B.

Fig. 4.—Relation system II. Relation plane: frontal plane of thorax. Indication of angle of head flexion in degrees ventral or dorsal. *A*, Head flexion approximately 60 degrees ventral. *B*, Head flexion approximately 20 degrees dorsal (in spite of supporting pillow). (From Gerber, M.: Beobachtungen an schlafenden Aktivatorträgern, *Fortschr. Kieferorthopädie*, Bd. 18, 1957.)

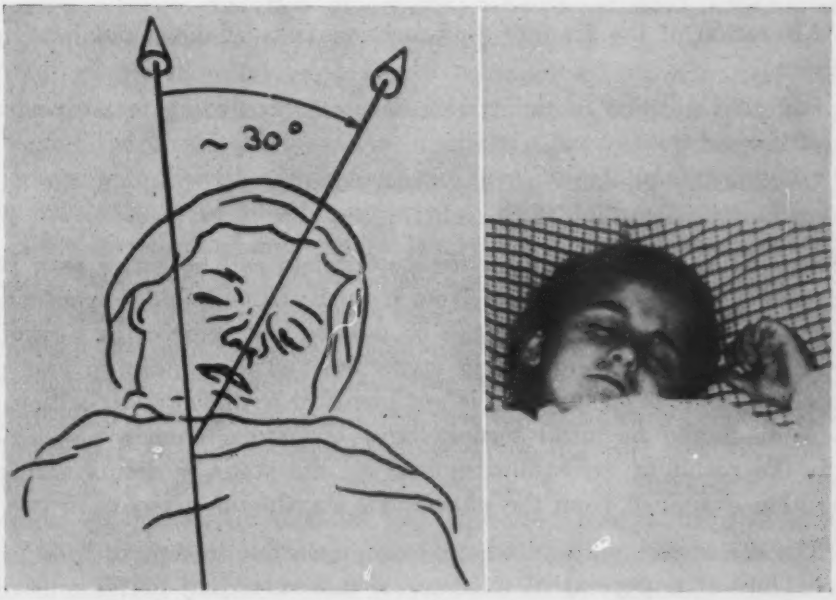


Fig. 5.—Relation system III. Relation plane: median plane of thorax. Recording of angles of flexion in degrees right or left. Head flexion 30 degrees to the left. (From Gerber, M.: Beobachtungen an schlafenden Aktivatorträgern, *Fortschr. Kieferorthopädie*, Bd. 18, 1957.)

there is a certain reciprocity between the powers from without and those from within. In addition, the position of the system in space at times is variable in three dimensions and depends also on the powers from outside: upright and resting positions (lying), etc. (Figs. 4 and 5).

Inside the system are found the mandible, the hyoid bone, and the tongue as three partners which are related by muscular tension to the frame and to each other. Each of these bodies shows a certain mobility, the mandible and the hyoid bone being passive and the tongue being active and/or passive. The tongue, therefore, may even help to move the mandible and the hyoid. During sleep, though, it often is a passive body (with the mouth open) or it may work as a spanning muscle bundle for the two other partners ("rest position" in Anglo-Saxon literature). The position (or movement) relationship of these three bodies depends on the momentary conditions in this three-dimensional power field. Working factors inside it include the following:

1. The variable *tension* of the different muscle bands, according to the momentary state of tonus or contraction.
2. The variable *number* of muscles tensioning the mandible according to the actual mode of function of the tongue and lips as an active or passive partner (state of open mouth or rest position).
3. The *weight* of the movable bodies in the system (mandible and tongue approximately 250 grams).
4. The different *guiding influences,* which may act on all the movable parts: ligaments, joints, complex of masticating facets, guidances by displacing muscle groups due to different torsions or flexions of the head.
5. The negative *air pressure* (only in rest position).

From neighboring influences that act on the system come the following:

1. Alteration of the frame's configuration (head flexion and head torsion).
2. Different position of the system in space (according to the position of the body).
3. Occasionally guidance coming from outside (for example, the hand or the pillow guiding the mandible).

The mandible's movements in the power field can be active as a result of the contraction of the musculature from it to the frame (under eventual stiffening of the movable frame), or it can be passive and indirect as a result of an active influence of the neighboring structures. The mandible's rest position (rest position, as it is meant here, is *not* identical with the rest position as used in the Anglo-Saxon technical terminology), examined from a *physical* standpoint, is the result of an equilibrium of all the static moments acting on it. Rest position examined from the *physiologic* standpoint presents in two forms:

1. The *active* rest position whereby the mandible is kept in "rest" (in balance at any point of its space of movement) by active muscular

contraction with an additional expenditure of energy. This dynamic, but in the physiologic sense false, rest position is arbitrarily taken by the normal patient. In a pathologic form, it is known as "pressing" of the teeth.

2. The *passive* rest position is differentiated from the active one by the mandible's being involuntarily and automatically put in a position responding to an equilibrium of all acting powers, thereby responding to the principle of the sparing of energy. This is, in the physiologic sense, the genuine rest position. The tongue and lips are usually in a simultaneous corresponding passive rest position with the mandible. There is a possibility of *two* fundamentally different forms of *passive* rest position:
   (a) Closed form, under intercalation of the tongue-lip loop, causing a reciprocally dependent balance position of the movable partners (so-called *physiologische Ruhelage* or, in Anglo-Saxon literature, "rest position").
   (b) Open form or "open mouth" (position of the habitual open mouth), being characterized, among other things, by greater freeway space and another type of tongue-lip function. Here, too, an equilibrium position of the movable partners is found.

In the closed and open forms of passive rest position, the position of the mandible in the respective power field is variable and is the result of all the vectors and guidances that influence it at a given time. This is illustrated by the following test: When the head (after having taken one of the two forms of passive rest position) is strongly flexed to the left, the mandible deviates to the same side. This is immediately recognized by a slight touching of upper and lower tooth rows. When flexion is to the right the mandible deviates to the right (in the direction of gravity). Strong ventral flexion of the head makes the upper incisal edge touch the lower incisal edge.

Among lowering powers, gravity (considered approximately 200 to 250 grams) plays an important role. Gravity changes direction with the different positions of the masticatory system in space. The tonus powers of the tensed muscle bands vary with the frame configuration. The negative air pressure in the closed form of physiologic rest position acts as a holding power as well as an introducing moment for the tonus of tongue-lip loop. With the vertically held body and head in an upright position, a primary and comparable position of the mandible is taken. It is called the *central rest position.* Innumerable different eccentric positions within the two forms—rest position and open mouth—are possible, depending on the conditions in the power field.

Observations on sleeping children resulted in a heavy predominance of the mandible's *passive* rest position in closed or open form. The body in a supine position adapts itself to the contour of the resting surface, which helps to determine the head-body position and therefore has an indirect influence on the mandible's position. There is also a possible direct influence of the pillow or the hand (held under the lower jaw) on the mandible.

Ordinarily, in the sleeping child the mandible is in eccentric position. Central rest position is incidental in the open as well as in the closed form. Normally, the mandible's active movements are relatively rare and involve only a short distance, a pathologic form of which is known as bruxism.

The frequency of movements varies individually, and in each patient it can also vary with the depth of sleep in the night and the condition of health; there are differences of depth of sleep in the night, and especially toward morning. The mandible may leave the previously taken passive rest position by active movement, remain a little while in active movement, then take a passive rest position again (or, rarely, it may pass into an active equilibrium position). If the relationship of the surroundings are unchanged, it goes back to the former position. If, at the same time, the surroundings become altered by a new position of the head or the body, the mandible moves to the place of new equilibrium. Each active alteration of the environment puts the mandible, if it is not in direct movement or stiffened, in a passive movement until it again finds the new position of equilibrium in either of the two possible forms; often even the form is determined by the surroundings.

The New Functional System With Inserted Activator.—Insertion of the physical apparatus ("activator") in the masticating organ leads to a new biologic system with new characteristics. The activator, in the sense of functional jaw orthopedics, is a passive apparatus with no strength of its own. It gets its strength from the functional milieu, and it is supposed to make use of it in the therapeutically desired sense. In principle, a common functional base for all cases to be treated is found. The mandible is strongly restricted in its freedom of movement by the activator. Only movements in the vertical dimension are possible; the two other directions are more or less blocked. This holds true for active as well as passive movements. For the passive rest position the actual bite activator means an interference in the mandible's power field. With vertical head and body position, as when the patient is seated in the dentist's chair, intermaxillary congruence between the actual bite activator and central rest position is present. This is not the case in any eccentric rest position, generally found in the supine position of the body. The actual bite activator hinders the passive deviations in the blocked directions, these normally being caused by the acting powers in the field (gravity, tonus powers, guidances); the mandible's free and natural action in coordination with its changing situation of the surroundings is mostly neutralized. The mandible, the tongue, and the activator occupy a fully altered balance position as compared to the normal (Figs. 6 and 7).

In addition to this, the eccentric activator with working bite already shows a primary incongruity to the rest position of the jaw in vertical, straight head and body position. Even in this original position, it leads to a disturbance of the equilibrium of the suspending musculature in the power field, forced shortening or lengthening of the antagonistic muscle bands compared to the "Nullänge" by reciprocal approximation or moving outward of their insertion points. The resulting tonus alteration of the musculature should cause the mandible to turn back to the original position during the

phase of passive rest position, but this is restricted by the activator's forced guidance; the turning-back powers are intercepted by the support. The same thing happens to eventually active power effects of potentially initiated but restrained movements in the blocked directions of the mandible. When the patient is lying down, an eccentric rest position is the rule, but this one coincides only occasionally and exceptionally with the eccentric activator construction. This effect, therefore, secondarily cumulates with that of the primary deviation out of the mandible's central rest position (by the working bite). The result is shown in the power's parallelogram: In each moment the power is given by the discrepancy between forced mandible position and the actual natural position, the way it would be taken if the activator were not inserted. This holds true for all possible movements as well as for all

Fig. 6.—Position of mandible and tongue with activator in place. *A*, Sagittal section. *B*, Frontal section. (From Herren, P.: Die Wirkungsweise des Aktivators, *Schweiz. Monatschr. Zahn.* **63**: 829, 1953.)

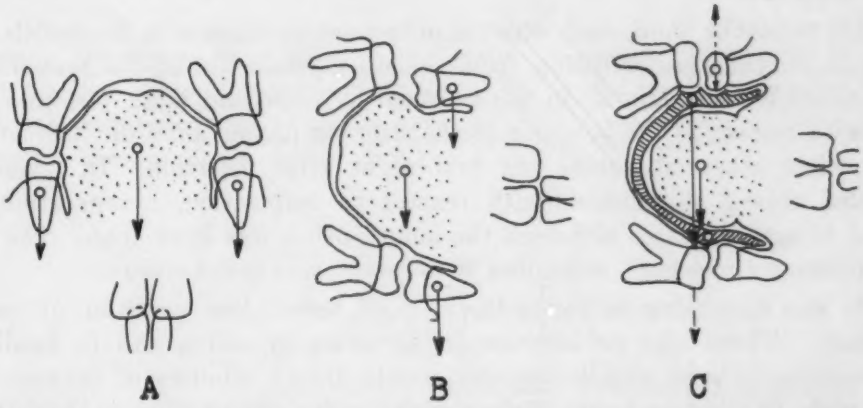


Fig. 7.—Activation of device by gravity in side position of body and head, in passive rest position of mandible. *A*, Upright head-body position. *B*, Side position without activator, deviation of mandible in direction of gravity. *C*, Side position with activator; support of mandible by mediation of activator on upper jaw. Transfer of weight of mandible, tongue, and activator to maxillary tooth row of side of direction of gravity. Reactive transfer to diagonally situated mandible's support zone. (From Herren, P.: Die Wirkungsweise des Aktivators, *Schweiz. Monatschr. Zahn.* **63**: 829, 1953.)

rest positions. The active and passive power effects, being caused by the tongue and the slight weight of the activator, are also brought into play more or less. The eccentric activator passes slowly into the actual bite activator with an increasing success in the treatment.

There is evidence that the usual situation of activator, maxilla, and mandible of a supine patient is one of intermaxillary bracing. Each movement of the mandible or its surrounding structures leads to an interruption or alteration of the bracing (clamping) with a labile situation of short duration

until a new bracing situation on the old position or on a new position is reached. Rest position means bracing, movement intermittence in this bracing situation, plus little shocklike impulses on the base.

Observations on sleeping patients wearing activators[2-6, 9] showed no noticeable influence of the apparatus on the general behavior of its wearer.

The activator does not alter anything of the usual body and head position; nor does it change the character of sleep, etc. The different body movements of the sleeping patients are executed in the same manner with or without the apparatus. There are no masticatory movements; nor are there other rhythmic movements taking place in the masticatory organ. The measured total movement time for the sleep before midnight is within extremely low limits. For one half hour of observation movements from a minimum of one second up to a maximum of one minute, spread over the whole curve, were found; often full rest for fifteen to twenty-five minutes is noticed. The average proportion of movement to rest is around 1:120 (approximately thirty seconds of movement per hour).

The Frequency of Movements With and Without Activator Stays the Same.—A function stimulation in the sense of an increased amount of movements could not be found. The activator has its effect possibilities mainly in the rest position by the diagonal bracing and pressure application instead of movement shocks.

On the other hand, such exterior influences as changes in the health status, fatigue, nervousness resulting from school, excitements of the previous day, and raised level of stimuli in the bedroom by noise and light, played a larger role with respect to the behavior of the sleeping patient than did the activator, even when observed during the first night after insertion. In seventy-five samples chosen at random, with respect to respiration, nosebreathing was found in seventy cases although the mouth often was kept open. The active rest position (pressing), according to Schwarz, was never observed.

It was surprising to notice the relaxed, tensionless condition of the musculature. There was no increase in secretion of saliva and in swallowing movements. There may be approximately thirty minutes of movement for each eight to eighteen hours of sleep with passive rest position of the mandible, movements being divided over the whole night and being more frequent before waking. The unconscious and natural behavior of the patient wearing the activator determines the system's dynamic character and its automatic self-guidance. The temporary progress of the alternating conditions in the power field depends more or less on chance. The orthodontist's influence on the development of power by the construction bite is modified in each moment by the self-guidance of the activator wearer. Nevertheless, an elective influence on the power development by the orthodontist may be possible over a greater span of time. The resulting powers are transmitted on the supporting base (Fig. 8). This consists of a supportive zone in the maxilla and in the mandible. The two zones lie diagonally opposite to each other and alter their form, dimension, and position to correspond to the situations in the power field; they continue over a part of the teeth and adjoining alveolar process.

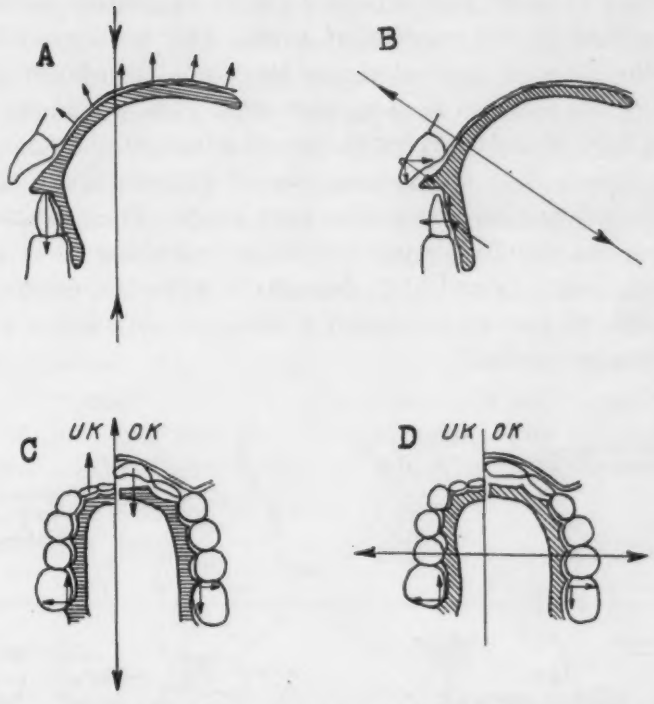


Fig. 8.—Direction of power in power field and effect upon teeth. *A*, Vertical power in convergence. Transmission upon teeth and hard palate. *B*, Sagittal-vertical power in divergence. (Hanging of mandible over forebite activator on maxilla, with tendency to open, found at dorsal flexion of head.) *C*, Sagittal power is split into smaller transverse-extending vector by geometric form and place of effect on teeth, and into large vector in original direction. *D*, Pure transverse power leads to sagittal vector on tooth, besides vector in original direction. *UK*, Lower jaw. *OK*, Upper jaw. (From Herren, P.: Die Wirkungsweise des Aktivators, *Schweiz. Monatschr. Zahn.* **63**: 829, 1953.)

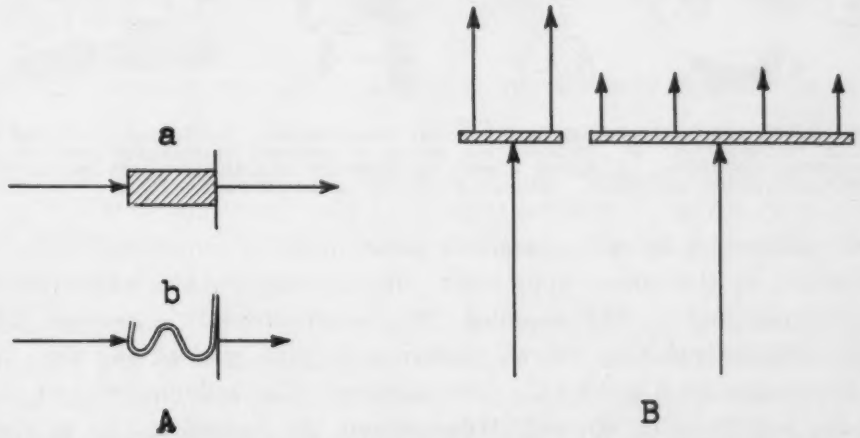


Fig. 9.—*A*, Rigid (*a*) and elastic (*b*) pressure-transmitting elements. *B*, Size of supporting surface and amount of effective power. (From Herren, P.: Die Wirkungsweise des Aktivators, *Schweiz. Monatschr. Zahn.* **63**: 829, 1953.)

The resulting power, acting at a certain moment, divides itself within each support zone (Fig. 9) and acts as pressure or pull on it, the vectors alternating their data in the current of time. The resilience of the mucous membrane of the alveolar process causes the main acceptance of the powers by the portion of the teeth on each support zone. Therewith, the activator enters the tension field of the tooth for the aimed adaptive migration in the therapeutic sense. Powers that are lacking can be introduced by the apparatus, and unfavorable existing powers can be kept away. The activator takes over the powers from the mandible's power field, transmitting them to the tension field of the teeth (Figs. 10 and 11). In a given activator, construction, direction, and strength of power application depend on the momentary conditions of the mandibular power field.

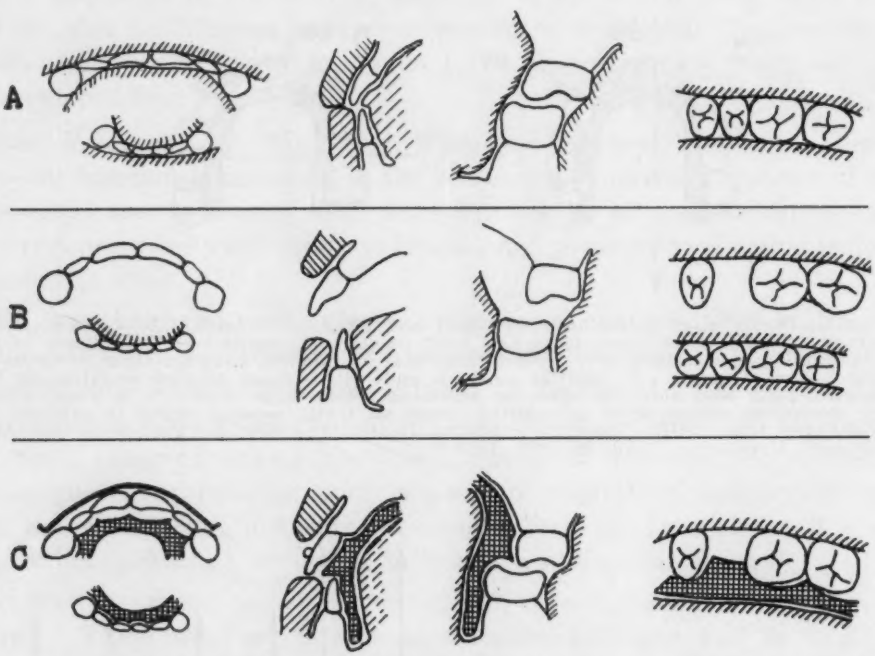


Fig. 10.—Tension field of teeth in differently formed milieu. *A*, Normal functional milieu of teeth in rest position. *B*, Dysfunctional milieu in habitual open-mouth position; space remaining after extraction. *C*, Milieu change by insertion of activator. (From Herren, P.: Die Wirkungsweise des Aktivators, *Schweiz. Monatschr. Zahn.* **63**: 829, 1953.)

Each alteration in the mandible's power field by movement leads to an intermittence in the power application on the single tooth, which we name "little intermittence." The so-called "big intermittence" is realized by the fact that the activator is not worn during a large part of the day, which allows the masticating organ full, free function. The orthodontist can choose, within the possible sites of power transmission, the desired site by an elective forming of guiding elements in coordination with the desired power rise, realized by an elective construction bite. The transmission of power from the activator to the teeth may be accomplished by hard or elastic guidance elements (Fig. 9). Sometimes power demands for therapeutic aims and their

transmission possibilities are not sufficient in all directions and strength conditions. This may set limits to the clinical possibilities of the passively used apparatus of functional jaw orthopedics. In addition to the alteration of milieu for the teeth and mandible, the activator causes also a change in the muscular parts of the mouth. The lingual space is restricted from both lateral sides as well as from the ventral and palatal sides. The tongue root can be deviated dorsally or ventrally when eccentric activators are used. The normal correlations between the tongue and the teeth are neutralized; the tongue often rests with all its weight upon the activator's sidewalls. The lips may be held away from the teeth. In case of high vertical dimension of the construction bite, the rest position (and therefore the right lip-tongue function) is out of the question. The activator in situ leads to a practically complete blocking of the condyle; in case of an eccentric activator, the condyle is blocked, in addition, at a new and unusual place. For the thumb-sucker, the activator means a causal interception on the existing (dys)functional milieu; it hinders sucking by keeping the thumb away.

Fig. 11.—Similar direction of power in *A* and *B*, but modification by form of place of action. (From Herren, P.: Die Wirkungsweise des Aktivators, *Schweiz. Monatschr. Zahn.* **63**: 829, 1953.)

ARE THERE SPECIAL BIOLOGIC QUALITIES RESULTING FROM THERAPY WITH THE ACTIVATOR?

This question is outside of the topic of the "mode of action of the activator" and can be answered only in connection with its effect on the tissues. The mode of action is the stimulus on the tissue, which may be noticed to react microscopically and macroscopically.

Starting from the conception of the activator's mode of action, and based on Häupl's numerous histologic examinations of the periodontium of men and animals, the functional jaw orthopedic method claims to be the only biologic method of orthodontics. No "pressure" is said to be applied; according to Häupl, pressure causes no tissue rebuilding at all. On the contrary, the "shocks" caused by the apparatus are said to have the only favorable effect on rebuilding. Since only muscular powers are said to be used, this method should be the true biologic one.

In the light of the new observations that I have made, that is, after the completion of a "missing link," two different principles are found within the activator's mode of action:

1. An *effective principle* accomplished by addition of all the pressure applications in a certain direction to a determined place of action, per unit of time. This "effective principle" is not equal for all the places and directions of action desired in a case. It can only partially be influenced by the orthodontist.

2. A *sparing principle* resulting from intermittent conditions. The activator is usually worn only at night, during sleep, that is, for about one-third of a day. For fourteen to sixteen hours the jaw is free in its function, without any hindrances. This is the "big intermittence," favorable to a recovery of periodontal tissue. During the time the apparatus is worn at night the "little intermittence" is also characteristic; pressure applications are interrupted from time to time by pressure-free or pressure-poor intervals because of the automatic self-guidance. Gubler[16] assumed, on the basis of his histologic work, that these intermittent conditions are most favorable for the tissue. Because of them, the periodontium will never be exposed to a long-lasting compression and hindrance of blood circulation leading to necrosis and resorption. Even strong powers, in point of intensity, which eventually become used stay harmless, their unfavorable effects obviously being reversible for temporary reasons.

The discontinuity of the power application not only means a quantitatively smaller influence on the tissues, but also becomes the qualitative difference by the behavior of the tissues: "quantity changes into quality." Furthermore, for the following reasons, the activator represents also great security against traumatic effects:

The rule that the apparatus must never brace intramaxillarily prevents too strong an activation by the orthodontist and leads to automatic harmless doses of power.

There is the possibility of unconscious removal of the activator from the mouth during sleep as a measure of protection against eventual traumatic powers.

In case of pain in places of compression (bending of the apparatus by dropping or cleaning), the patient can consciously leave the apparatus out and go to the orthodontist for consultation. Interesting and impressing as a paradox is the fact of the sparing principle being based more on the active conduct of the patient; the passive conduct of the activator, on the other hand, is responsible for the greater part of the effective principle.

SUMMARY

Subsequent to a reference of the origin of the "activator" by Andresen and Häupl and a description of the theory of functional jaw orthopedics concerning

therapy with this orthodontic apparatus, a physical analysis of this apparatus is presented. The functional milieu giving the apparatus its typical mode of action is discussed, and the correlations between the single parts of this biologic system are revealed. A resulting new presentation of the mode of action of this apparatus is discussed in detail.

According to the new presentation, the question of the special biologic quality of activator therapy can be answered as follows: Besides an "effective principle," this apparatus also shows a "sparing principle." The "effective principle" embodies the addition of action on a determined place per unit of time. As in "classical orthodontics" also in functional jaw orthopedics, *pressure* is used as rebuilding stimulus. There is no dualism *("classical orthodontics" versus "functional jaw orthopedics")* in this fundamental point of view. This is opposed to Häupl's opinion. The "sparing principle" results from conditions of intermittence of this apparatus' mode of action, which offers great security against traumatic effects. A slow, harmonic tissue rebuilding is observed, according to the histologic examinations of Häupl.

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VISUAL AND AUDITORY AIDS: THEIR ROLE IN NATIONAL AND SECTIONAL ORTHODONTIC MEETINGS*

T. M. Graber, D.D.S., M.S.D., Ph.D., Kenilworth, Ill.

THIS information has been prepared for essayists and program chairmen of the American Association of Orthodontists and its component societies. The marked increase in the size of the meetings each year makes it imperative that greater attention be paid to the use and misuse of visual and auditory aids. It is hoped that this information will enhance the already high level of presentations.

Slides are the Achilles heel of many a good paper. The slide that cannot be seen beyond the first fifteen rows detracts from a presentation, no matter how good and important the slide may be. Many a slide that is satisfactory for a small room is totally inadequate for a large meeting. At some meetings no more than 10 per cent of the total number of slides shown can be seen by the entire audience. Poor slides are deadly, for they kill audience interest.

No more than eight printed lines should be placed on any slide, and these should fill the entire field. A lesser number is preferable. Typed material is satisfactory, but special handling is necessary. The material to be photographed should be typewritten, with a carbon ribbon if possible. An electric typewriter usually cuts sharper letters. A piece of black carbon paper should always be put behind the sheet, facing the back of the sheet of paper. This will give a darker outline to the characters to be photographed. The important parts should be underlined with India ink. When typewritten copy is photographed, a telephoto lens, focusing bellows, or extension tubes should be used so that the material is magnified. Small colored plastic letters and numbers can be bought quite cheaply, and when photographed with colored film, they make an effective printed slide. Art stores sell small black numbers and letters, with adhesive on the back, that may be used for the same purpose.

TABLES AND TRACINGS

Tables are vitally important to research and, of course, are important parts of a printed paper, but on the screen they seldom are effective. Audience tests have shown that little, if any, of the material shown is absorbed from most tabular and technical slides used in conjunction with research reports. Such slides are often overcrowded, too technical, and left on the screen for too short a time because there are too many slides in the first place. If the essayist does

*These instructions were developed for the 1960 meeting of the American Association of Orthodontists of which Dr. Graber is general chairman.

not want to lose audience interest, he should simplify and summarize the tables for projection, stating that the complete findings will be found in the published paper.

Cephalometric tracings and analyses are subject to the same limitations as tables. The audience is usually lost in a mass of figures and a maze of lines. Only the salient cephalometric criteria and summarizing measurements should be given, not the total analysis. If the information is vital to the paper, it should be broken up into two or three slides. All such slides should be projected and checked for organization and ease of viewing *before* the actual meeting. If there is any question, the essayist should feel free to send the slide or slides to the program chairman for his advice. Even the most accomplished speakers remake slides frequently after a preview of their material.

MODELS AND X-RAYS

Despite the fact that it is quite convenient to show "before" and "after" casts at the same time, it is thought inadvisable for more than two models to be on the screen at any one time. The use of more models, photographs, or radiographs reduces the size of each item to the point where none of the objects shows up very well to a large percentage of the audience. It is better to show less and know that the audience can see what is being illustrated. The use of two projection screens is not the answer, either. The second screen is usually much smaller, and back-of-the-room viewers see only vague outlines as they crane their necks for a better view. In photographing casts, one should not use too varied a background, for it will detract from the details to be shown by the models. A solid dark green, dark red, or black background is best. Blue or light red is more colorful but less desirable. An effective way to identify casts and photographs is by the use of small black numbers or letters that are available commercially. These can be glued to the model, photograph, table, or chart, and they show up quite well on slides. Unless the slide of the model actually illustrates a very definite point, it should be omitted. Showing a battery of slides of the same case merely in the interest of completeness detracts from the lecture.

Dental x-rays seldom show up well when projected on a screen. The use of more than four dental films for the entire screen reduces the detail to the point where it means little to those viewing it. It is better to select those views most intimately related to the orthodontic problem. For example, in an extraction case the first premolar areas may be the views of choice; if there is resorption in the upper or lower incisor areas, these may be chosen. Or it may be wise to show the dental radiographs on two or three separate slides. However, inclusion of an entire examination on one slide is not at all satisfactory.

FACE AND APPLIANCE VIEWS

Photographs are also valuable, but these are frequently overdone. One profile and one frontal view each are usually adequate for "before" and "after" records. Combined cephalometric headplates and photographs, as used by Margolis, are effective. Headplates by themselves, even when identified with opaquing media, are less satisfactory. Cephalometric tracings may be preferred.

Appliance detail should always be photographed with a telephoto lens, focusing bellows, or combination of extension tubes to give the desired magnification. Too many appliance elements on the same slide can be confusing. An essay is not a substitute for a clinic or a practical demonstration.

TECHNIQUE DETAILS

Glare from the screen can be discomfiting. In the showing of charts, tabular material, or cephalometric tracings, it is frequently easier on the eyes not to use white as a background, now that powerful projectors and colored slides are available. Yellow or orange produce less eye strain. If the slides already have a brilliant white background, the use of a piece of amber cellophane between the slide and the cover plate will reduce the eye glare and still leave the slides as readable as they were originally.

Essayists often have difficulty in estimating the time to be allotted to the showing of slides. Seldom do they add the time used in explaining the slides to the time required for reading the paper when they practice before the actual meeting. One way of determining this is to figure how much space each slide, converted to normal-sized photographs for publication, would take up when incorporated in the final paper. It takes about three minutes to read a typed page, so a good rule of thumb to follow is to figure at least three minutes for every page of illustrations shown. (This means adding about three minutes for every five slides shown.) Fifty slides should be the maximum for most essays.

In the interest of uniformity, it is not unfair to ask each essayist to prepare his slides in the 2 by 2 inch or bantam size. The swing has been overwhelming in this direction in the past ten years. Large-sized lantern slides almost date an essayist, and they offer little advantage in the final image and no advantage as far as compactness, fragility, and ease of handling are concerned. Limiting the slides to 2 by 2 inches would ease the load on the projectionist, who is frequently unfamiliar with the material. Tabular material comes out quite satisfactorily on 35 mm. slides if microfile or a contrast process type of film is used. Colored film requires more care and may not do as good a job. Commercial photographers know what type of film to use, and essayists should avail themselves of professional guidance, wherever possible, rather than rely on their own camera setups.

Slide binding and marking are important. Conventional cellophane pressure-sensitive tape is usually not very satisfactory. While it is easy to use and sticks well at first, it becomes gummy and the slides tend to stick to each other and jam the projecting mechanism. Metal slide mats and binders are quite adequate, but they permit dust and dirt to enter the slide. There is a new ultrathin and strong Mylar pressure-sensitive silver binding tape available that eliminates these disadvantages. Whatever kind of tape is used, however, one should be sure to miter the corners. Merely folding the corners over invites projection trouble. The essayist must make sure that his slides are properly arranged and marked for projection. The emulsion (dull) side should always

be away from him and away from the light source in the projector. Printing will always project as it should be read, then. The slide is then turned upside down, and a red marking disk can be affixed in the upper right-hand corner (or the lower left-hand corner when the slide is viewed right side up). Numbering of slides is recommended, and the essayist's manuscript should be keyed with the number to reduce time lost in the event he must return to a previous slide or if the slides are inadvertently disturbed.

PROJECTOR

The projector should be at least 500 watts, and preferably 750 or 1,000 watts, if color or 3¼ by 4 inch slides are to be shown. It is wise to have projectors for both 2 by 2 inch and 3¼ by 4 inch slides available, since some essayists interchange slide size during a presentation. While every effort should be made to discourage this, the program chairman should have both sizes available, just in case. For an emergency, extra bulbs and an extra projector are essential. If a 1,000 watt projector is used, it is possible to have subdued side lighting in the room to reduce the soporific effect of keeping the audience in the dark during the presentation.

If the essayist will use 2 by 2 inch slides, he can fit them into a cartridge, or magazine, which holds thirty-six slides. Then slides cannot get out of order. The essayist must check ahead of time to make sure that the slides are all right side up. Nothing is more disconcerting to both the audience and the speaker than to have the projectionist fumbling in the dark to turn a slide over or to go back or ahead a couple of slides to find the correct illustration. If many more than thirty-six slides (one magazine) are used during a forty-five minute lecture, the beneficial effect of visual aids can be reduced or lost. There is also the added danger of the speaker running beyond his allotted time. Many programs do not start on time. Seldom is time allotted for introductions and the between-speakers interval. Circumstances thus combine all too frequently to haunt the last speaker of the morning—and the audience—with the spectre of starting his paper a half-hour or forty-five minutes late.

It is almost essential that the speaker have a way of direct communication with the projectionist. A good method is to have a button that he can press, which, in turn, lights up a small bulb to notify the projectionist that he is to go on to the next slide. Sometimes a buzzer is used. With some of the newer equipment, with automatic features, the pressing of the button by the speaker actually changes the slides, and the projectionist need stand by only for emergencies.

ELECTRIC POINTER

An electric pointer is essential for the slide-showing procedure. The essayist should familiarize himself with the working of the pointer before he ascends the rostrum. Having a co-worker operate the pointer from the front row eases the load for the essayist. Valuable time is often lost as the nervous speaker struggles with unfamiliar equipment. Occasionally, the projector has a built-in

type of pointer. This can be used to advantage by a projectionist familiar with the wishes of the speaker. It is a good policy for the essayist to contact the projectionist before presentation of his paper to make any special instructions clear.

PROJECTION SCREEN

For adequate viewing of the average slide, the beaded or illuminized screen should be a minimum of 10 by 10 feet. Much to be preferred is the standard movie-size screen of 9 by 14 feet. Most lectures are held in rooms that are longer than most movie houses are deep, so this is not an unreasonable request. Few hotels have such large screens; when they do they are often yellowed with use and age and usually have poor surfaces to catch and hold the projected images. The importance of a good, proper-sized screen cannot be overemphasized because of the almost universal neglect of this essential in good viewing. Even the best slides can be ruined by too small a screen. Arrangements should be made to procure a good viewing screen ahead of time.

PODIUM LIGHT

Almost all essayists read their papers as they show slides. Adequate illumination is necessary to facilitate the reading, and a podium or rostrum light is usually available. In many instances, the light not only illuminates the manuscript, but it casts an unfortunate glare over the projection screen. This reduces readability, "washes out" colors of the slides, and is annoying to the audience. Few podium lights are properly designed for use with visual aids. The program chairman or local arrangements committee should check very carefully to see that the reading light is shielded from the screen itself. A piece of cardboard may be all that is necessary, or maybe turning the podium at an angle can eliminate unwanted stray light.

SOUND EQUIPMENT

The day is past when the essayist could shove aside the annoying cylindrical gadget in front of him (the microphone), raise the volume of his voice, and carry the whole room on his vocal cords. Large rooms and large audiences drink up sound waves, and amplification is essential. Yet, few essayists know how to use a "mike" properly. Many have never had the experience and either hang on for dear life or back away to the point that the instrument is useless. In most hotels, the equipment is adequate for normal use. Showing slides, with the speaker turning his head to point out certain details, does not seem to come under the heading of "normal." A halter type of microphone, hung around the neck of the speaker, is necessary to maintain constant volume and consistent distortion-free tone. This eliminates the "too near or too far" dilemma with a stationary microphone. It is advisable for the essayist to have a dress rehearsal with the sound equipment as well as the projection equipment before the formal presentation. This can usually be arranged before the morning program starts. The program chairman should encourage such arrangements and plan to be present himself to advise.

MISCELLANEOUS

A chalk talk is effective in a small room, but blackboard illustration is totally inadequate in general meetings the size of those held by the American Association of Orthodontists and its component societies. No blackboard or chalk should be at the podium to encourage the essayist to use it. For limited, or registered clinics, of course, the blackboard is an important adjunct.

Opaque projectors, which throw an image taken directly from graphs or line drawings, do not give a satisfactory picture. In addition, light usually streams out in all directions from the projector itself, making it more difficult for viewers near the projector to see anything at all. Special x-ray projectors are also limited to small rooms, and slide conversion is recommended for all head x-rays.

A comforting prop for the essayist is a glass and pitcher of water. The tightened throat muscles and Sahara-dry mouth and throat that afflict most speakers respond readily to water. Even when it is not used, it is reassuring to know that succor is present if the need arises.

450 Green Bay Rd.

FOREWORD

The *New York Journal of Dentistry* made an excellent contribution to this year's celebration of the one hundredth anniversary of the founding of the American Dental Association.

In its May, 1959, issue the *Journal* publishes a series of articles by invited guest contributors from the fields of public health, social sciences, and dentistry, who give their views of the professional achievements of dentistry over the past century. In these articles there also appear equally interesting predictions interspersed as a look into the promising future.

It is noted that in connection with orthodontics something is said by B. W. Weinberger (author of *Introduction to the History of Dentistry* and former professor of history and literature at New York College of Dentistry), and Joseph D. Eby writes on "Achievements in Dentistry and Orthodontics." These two authors have spent much of their lives in the practice of orthodontics, and they are both pioneers in the field.

By permission of the *New York Journal of Dentistry* we reproduce herewith the article by Joseph D. Eby because it is thought to be of interest to the readers of the AMERICAN JOURNAL OF ORTHODONTICS and because Dr. Eby is editor of the Northeastern Society of Orthodontists.

Editor.

ACHIEVEMENTS IN DENTISTRY AND ORTHODONTICS

JOSEPH D. EBY, D.D.S., NEW YORK, N. Y.

THE heraldry of the approaching Centennial celebrations, marking the hundredth anniversary of the founding of the present American Dental Association, should justly record one of the greatest epochs of all time in the past, present, and future history of dentistry.

During this epic period there have been other highly noteworthy celebrations, combining the anniversaries of the great landmarks of American history with progress in dentistry. Of great magnitude was the Dental Centenary Celebration in Baltimore, March, 1940, the hundredth anniversary of the founding of the first dental school in America, The Baltimore College of Dental Surgery. In the record of these *Proceedings* appears the inscription from a monument in the National Archives Building, Washington, D. C., "The heritage of the past is the seed that brings forth the harvest of the future."

Contemporary within this Centennial of the American Dental Association, let us take a closer look at the achievements of the great men in dentistry and

orthodontics, that we may more fully realize and revere the pioneer contributions they made to progress, and more fully appreciate the works which they so generously gave to our heritage.

There were none more brilliant with whom to start than with the life and works of Norman W. Kingsley, 1829-1913—"A Man of Genius!" Dr. Kingsley's book, *A Treatise of Oral Deformities as a Branch of Mechanical Surgery,* is a text that will forever stand the tests of time. Dr. Kingsley was authentically accredited as the "Father of Modern Orthodontics," and his principles of practice as such, and in cleft palate restorations, as well as in general dentistry, are just as sound today. He was also a great artist in painting and sculpture, and deeply inculcated *art* into his dentistry, as there should be art in all dentistry of the highest quality. Dr. Kingsley was the first Dean of the New York College of Dentistry and first President of the New York Board of Censors (Examiners).

In 1911 the famous paper by Dr. Charles Mayo, "The Oral Cavity as a Portal of Infection," contributed largely to revolutionize dental and oral pathology. Again in 1915, Dr. Mayo emphasized the fact that through its benefits a growing branch of dentistry, known as Orthodontics, was destined to become one of the great branches of *preventive medicine.*

With the massive increase in population and the widening ranges of socio-economic levels, the healing arts will be faced with the momentous problems and disproportions of supply versus demand. Within the resources of the fifty-one dental schools, the target should include revisions and overlapping of teachings more in the subjects of prevention and interception in the undergraduate curriculum, under standardized directives from the Council on Dental Education of the A.D.A., and the highest educational echelons of integrated training.

It is my firm belief that these resources within ourselves, leadership, courage, cooperation, and respect for discipline we should be thoroughly capable to meet the growing needs of a changing world.

Orthodontic Profiles

EARL WILDES SWINEHART

EARL WILDES SWINEHART was born in the town of Adelphi, Ohio, on Sept. 21, 1875. His ancestors had originally settled along the Eastern Seaboard, but after the Revolutionary War they migrated to Ohio at the time when good, fertile land could be bought for 20 cents an acre and payments could be made in installments over several years. Though agriculture was in his blood and he apparently was never able to get it out, Dr. Swinehart also had a background of professional life to influence him, for his mother's father, grandfather, and grandfather's brother were physicians. In boyhood he, too, dreamed of becoming a physician because it seemed a fine thing to carry on the tradition. Dentistry, however, became his chosen field through certain experiences with his own dental problems.

Having made his choice, the big question was how to finance three years of dental education. He had no money of his own and no one to call upon to furnish it. Being far-thinking, methodical, and practical, he decided to earn a substantial amount by teaching school. After taking a course in pedagogy he began teaching in the local grade school and continued to do so for five years. The salary was small ($30.00 a month for the eight-month term), and the hours were long. In addition to teaching, he swept and dusted the large classroom daily and carried coal to fire the two stoves. He always looked back on these teaching experiences with thankfulness because they taught him the lesson of self-reliance.

In 1899 Dr. Swinehart entered the Ohio College of Dental Surgery, from which he graduated in 1902. At graduation, he was honored by his class by being selected to deliver the class address at the commencement exercises.

He returned to Adelphi and started general practice, making use of the new anesthetic of the time (cocaine) for the extraction of teeth, and in short order he became exceptionally busy. Even with so much success in that field, he was observing the beneficial effects of orthodontic treatment and the progress being made under the influence of Dr. Edward H. Angle. He knew then what his future would be, so in 1909 he enrolled in the Angle School of Orthodontia.

In 1914, Dr. Swinehart, after talking with Dr. Kelsey, began practice in Baltimore as an orthodontic specialist and, remembering his early days as a teacher, joined the faculty of the Baltimore College of Dental Surgery as demonstrator in orthodontics. Later, following the merger of the University Dental School and the College, he became professor of orthodontics in the resulting single institution. He continued to specialize in Baltimore and after

his son, D. Robert Swinehart, graduated from dental school he made room for him in the office. He remained active to the end of his career, with a vacation now and then to his beloved farm in Ohio. As was mentioned before, agriculture was in his blood and he apparently was never able to get it out. While visiting his sisters in the city of his birth, Adelphi, Ohio, he died suddenly on July 20, 1958.

Dr. Swinehart had worked assiduously for the improvement of our special field and for the whole dental profession. He contributed clinics, case reports, papers, inventions (the band driver and the band remover), and a chapter on band techniques for an orthodontic textbook. He wrote many papers, and three in particular have been of special value to the profession: "Pernicious Muscular Habits," "Structural and Nervous Effects of Thumb-Sucking," and "Clinical Study of the Open-Bite."

EARL WILDES SWINEHART

Dr. Swinehart was a member of the following organizations: American Dental Association, Maryland State Dental Association (past president), Baltimore City Dental Society, American Association of Orthodontists, Middle Atlantic Society of Orthodontists, Northeastern Society of Orthodontists (nonresident), Washington-Baltimore Society of Orthodontists (past president), Eastern Association of Angle Graduates (past president), American College

of Dentists (past regent and past president), American Board of Orthodontics (certificate), Omicron Kappa Upsilon (honorary member), and Psi Omega dental fraternity (honorary member).

Many honors were bestowed on him for his scientific contributions, his work on committees, his teaching, and his ability as a leader. On Oct. 4, 1954, at a luncheon meeting in Atlantic City, the members of the Middle Atlantic Society of Orthodontists presented Dr. Swinehart with a citation which may have meant more than some of the other recognitions of merit because it came from his closest associates and honored him as "a respected and beloved friend."

There is nothing special about this expression of high regard for Dr. Earl Wildes Swinehart, for recognition transcends that sort of compliment, and there is no need for a lot of vacuous words to make his service to the profession and the public outstanding. Over the years he has well earned that approbation.

Paul A. Deems.

Editorial

DR. REUBEN BLAKE RETIRES

ANOTHER specialist on the Pacific Coast has retired. Asked why he retired when still in good health and physical condition, Dr. Reuben Blake replied that he has a slogan which goes something like this: "Don't retire unless you are young enough to enjoy it."

Dr. Blake retired after practicing orthodontics for thirty-two years in San Francisco; in addition, he has enjoyed an unusual hobby for many years. It is that of making pencil drawings of dogs. The drawings are of professional quality and have been in circulation for a good many years. Dr. Blake was inspired in this work by the late E. H. Burbank, famous artist and author.

In addition to his artistic activities, he has been a vigorous contributor to organized dentistry and dental education. A partial listing of his positions includes: Associate Clinical Professor of Orthodontics, College of Physicians and Surgeons, 1926-1956; Director of Publicity, American Dental Association, 1949-1955; Editor, *Bulletin of Pacific Coast Society of Orthodontists,* 1932-1958; and Department Editor, *California State Dental Journal,* 1940-1958. Reuben, as he is known to his many friends, has not by any means lost interest in dental activities. He is now editor of the San Francisco Dental Society *Newsletter* and acts as chairman of the Counseling Committee and a member of the Editorial Board of the *Journal of the California State Dental Association.* In addition to that, he manages to find time to serve on current committees of West Coast dental organizations.

This records the retirement of one of California's busiest orthodontists and one who has made a tremendous contribution to his profession. Obviously, his slogan ("don't retire unless you are young enough to enjoy it") is working out to his satisfaction, and his many friends everywhere no doubt will wish him happiness in his retirement at least from a job to a hobby.

H. C. P.

In Memoriam

LLOYD STEELE LOURIE, SR.
1877-1959

IT IS with deep regret that we note the death of one of our most illustrious members.

Lloyd S. Lourie was born in Keokuk, Iowa, on Sept. 3, 1877. He graduated from Keokuk Dental College in 1899 and then enrolled as a student in one of the first classes in orthodontics conducted by Dr. Edward H. Angle in St. Louis.

He established an office in Keokuk and taught orthodontics at the Keokuk Dental College for one or two years. During this period he also served as chief instructor in the Angle School of Orthodontia. In 1901 he moved to Chicago, where he practiced orthodontics exclusively until his retirement in 1938.

At this time, he moved to Sanibel Island, off the west coast of Florida; later he lived in Fort Meyers on the mainland. Several years ago he moved to Santa Monica, California, where he lived until last summer, when he and Mrs. Lourie went to Peoria, Illinois, to live with their son, Lloyd S. Lourie, Jr., who practices dentistry in that city.

In October, 1958, Dr. Lourie suffered a slight cerebral hemorrhage but seemed to make a good recovery for a while. Later he had a more severe attack and was placed in a Peoria hospital. He died on March 12, 1959, a few months after his eighty-first birthday.

Dr. Lourie was a charter member of the American Society of Orthodontists (now called the American Association of Orthodontists) and was the last surviving member of that small group of pioneers who contributed so much in laying the foundation for the current status of the progress and development of our specialty.

At the first meeting of the American Society of Orthodontists in 1901, Dr. Lourie read a paper entitled "Is Orthodontia Justly Represented by Its Teachings?" This was published in *Dental Items of Interest* in 1901. Later he presented eleven other papers which were published in dental journals.

Dr. Lourie contributed many important and timely discussions of papers, forty-five of which are published in our journals. In many instances these

discussions were of more importance than the papers. He was very critical at all times and never hesitated about vigorously opposing any statements made by an essayist with which he did not honestly agree.

He gave many valuable clinics and demonstrations at meetings of orthodontists. He was an expert technician and a perfectionist in all his work. On some occasions he made new types of appliances or attachments and had them cemented to his own teeth as a form of experimentation.

He was one of the first operators to use a lingual arch mechanism. He originated the high labial arch appliance.

Also, he invented a wire-stretching plier which came into fairly popular use. Another invention was a plierlike instrument for cutting spurs on labial arches, which would hold wire ligatures in desired position with no slippage.

Dr. Lourie served as president of the American Society of Orthdontists in 1904 and 1905. He was a charter member and first president of the Chicago Association of Orthodontists and contributed generously in all of its activities. Upon his retirement in 1938, he was made an honorary member.

Lloyd Lourie was always admired and respected by his colleagues as one of our leading orthodontists. We shall miss one of our finest members and a true friend.

Dr. Lourie is survived by his widow, Mrs. Caroline Lourie; a son, Dr. Lloyd S. Lourie, J., of Peoria, Illinois; a daughter, Mrs. Elinor Rykaert of Fort Knox, Kentucky; a sister, Mrs. Sydney Rogers of Santa Monica, California; a brother, Herbert Lourie of Fort Myers, Florida; and five grandchildren.

MAY IT BE RESOLVED that this resolution be made a permanent part of the official records of the Chicago Association of Orthodontists and that copies be sent to his surviving relatives. Our kindest thoughts are with them.

Respectfully submitted,
CHARLES R. BAKER

GUY GILLESPIE
1899-1958

GUY GILLESPIE of Abilene, Texas, died on Aug. 20, 1958.

Dr. Gillespie was born on April 27, 1899, in Moran, Texas, the son of the late Dr. and Mrs. Walter Gillespie. The family later moved to Cisco, Texas, where Dr. Gillespie attended public schools. After he graduated from Cisco High School, he attended Vanderbilt University, where he was a member of Phi Kappa Psi and Psi Omega fraternities. After graduation from Vanderbilt, Dr. Gillespie attended the Dewey School of Orthodontics in New York City, where he graduated in 1923. He served in World War I.

Dr. Gillespie had been in practice in Abilene for thirty-five years and was widely known throughout the state as a pioneer in the practice of orthodontics. For a time he maintained offices in Cisco and San Angelo in addition to the

one in Abilene. He discontinued his work in Cisco after a few years but continued to spend one day a week in his San Angelo office until he suffered a heart attack seven and one-half years ago.

A charter member and past president of the Rotary Club, he was a member of the Abilene Chamber of Commerce, the First Baptist Church, and the Men's Victory Bible Class.

He was also past president of the Southwestern Society of Orthodontists, a member of the American Board of Orthodontics, the State Dental Society, Taylor County Dental Society, and the Taylor-Jones County Medical Society. In addition to his professional work, Dr. Gillespie operated a fourteen-section ranch, the G.L. Ranch in King County for the past twenty years.

Dr. Gillespie is survived by his wife, the former Louise Cowan of Stephenville, a sister, and two nephews.

Dr. Gillespie's death was a severe shock to his many friends and Orthodontics has lost an enthusiastic and valuable member in his passing. The Southwestern Society of Orthodontists extends its deepest sympathy to the family and expresses its sorrow in the great loss sustained.

Respectfully submitted,
E. B. Pulliam, D.D.S.
George R. Webber, D.D.S.
Tom M. Matthews, D.D.S., Chairman

DONALD H. GLEW

IT IS with a deep sense of sorrow that we report the death of Donald H. Glew, Sr., at the age of 58. Dr. Glew was born in Ottumwa, Iowa, the youngest of four children of parents who came to this country from Lincolnshire, England. The family having moved to Washington in 1917, he received his early education there and graduated from Central High School.

He received his dental training at George Washington and Georgetown Universities, graduating from the latter in 1922. Having received his graduate training in orthodontics at the University of Illinois, he commenced the practice of his specialty in 1938 and continued until the time of his death on April 21, 1959.

Dr. Glew was an officer in the Army and a member of the District of Columbia Selective Service Medical Advisory Board during World War II. He was a former vestryman of the St. Stephen and the Incarnation Episcopal Church. He also belonged to the National Sojourners, Kappa Sigma, and Xi Psi Phi fraternities.

Dr. Glew is survived by his wife, Pearl B., to whom he was married in 1923; two sons, Major Donald H. Glew, Jr., Army Medical Corps, and Dr. William B. Glew of Chevy Chase, Maryland.

Dr. Glew was an ardent worker in the Middle Atlantic Society of Orthodontists for many years and was serving as chairman of the Budget Committee at the time of his death.

HERBERT RIEMENSCHNEIDER

HERBERT M. RIEMENSCHNEIDER, of Rocky River, Ohio, died at the age of 57 on Oct. 15, 1958, after a short illness.

Dr. Riemenschneider was a graduate of Baldwin Wallace College and Western Reserve Dental School. His orthodontic education was obtained at Ohio State University and the University of Pittsburgh.

He was a member of the Cleveland Dental Society and was the incoming president of the Cleveland Orthodontic Society. He was a member of the Great Lakes Society of Orthodontists and of the American Association of Orthodontists. He was also a member of the Lambda Chi Alpha fraternity and the Delta Sigma Delta dental fraternity. He belonged to the Lakewood Masonic Lodge, the Lake Erie Consistory, the Al Koran Shrine, the Hermit Club, and the Cleveland Yachting Club.

Surviving Dr. Riemenschneider are his wife, a son, a daughter, a brother (Dr. Walter Riemenschneider), and his mother.

BE IT RESOLVED that this Society place this memorial on its permanent record and that a copy be sent to the family.

ROBERT R. MCGONAGLE
Necrology Committee
Great Lakes Society of Orthodontists

Report

REPORT OF THE EDUCATION COMMITTEE, AMERICAN ASSOCIATION OF ORTHODONTISTS
1958-1959

THE Education Committee sponsored an orthodontic workshop, held June 16 through 21, 1958, at the University of Michigan, in conjunction with the W. K. Kellogg Foundation Institute and the Great Lakes Society of Orthodontists. Financial support for this project was given to Dr. Moyers and the Committee at our last meeting. Since the orthodontic workshop was so ably planned by Dr. Moyers, we thought it best that he present the report concerning the meeting; therefore, a detailed report of the procedures and financial arrangements will be given by Dr. Moyers.

The Education Committee is in general agreement with the recommendations made by the Study Group 11 of the orthodontic workshop held in Ann Arbor in June, 1958. At least two of these recommendations, however, we would like to clarify:

1. The workshop report suggested that eighteen months should be the minimum length of time for graduate courses and long-term postgraduate courses in orthodontics. The Education Committee recommends that such programs should run a minimum of twenty-four consecutive months and suggests that thirty months for the graduate program is preferable.
2. While it is desirable to emphasize one appliance technique in such courses, the Education Committee feels that graduate students should have both lecture and clinical experience with other standard orthodontic appliances.
3. The thesis requirement for the Master of Science degree should be an original piece of research and not merely a library report.

In February, 1959, the Education Committee had a conference at the American Dental Association headquarters with the Education Committee of the American Dental Association and the secretary of the Council on Dental Education, Dr. Shailer Peterson. We made certain recommendations to them concerning graduate and postgraduate orthodontic education. These recommendations are included with our report. It is recognized that these requirements are not ideal, but they are at least a beginning in an attempt to standardize graduate and postgraduate orthodontic education in the dental schools in the United States.

RECOMMENDATIONS FOR MINIMUM REQUIREMENTS FOR POSTGRADUATE ORTHODONTICS

1. The program should run two years and preferably twenty-four continuous months.

2. Since the transfer of patients in orthodontics is such a problem, even though it is not possible to "master" even one appliance or system of orthodontic therapy in the graduate program, it is advisable to emphasize one appliance technique and to familiarize the graduate student with more than one of the other most commonly used appliance techniques by *lecture and clinical experience.*

3. Students should treat a sufficient number of patients, using each type of mechanotherapy, in order to be proficient. Merely reading the theory will not suffice; the student must have experience.

4. The orthodontic faculty should be composed of members who not only have the knowledge of theory for treatment but have been successful with actual treatment of cases of malocclusion. The clinical staff should be composed of members with different treatment ideologies.

5. The student should be full-time in orthodontics.

6. The student should devote at least one-half of his time to clinical practice and laboratory and the other half to reading assignments, formal lectures, and seminars and research.

7. Lectures in parallel fields should include:

Head and Neck Anatomy
Growth and Development
Anthropology and/or Genetics
Elective subjects: Oral Physiology, Oral Pathology, Histology in Tooth and Bone Formation, and Embryology of the Face

(The above subjects preferably should be taught by the graduate faculty and at a graduate level.)

8. A certificate of proficiency should be issued.

RECOMMENDATIONS FOR MINIMUM REQUIREMENTS FOR GRADUATE ORTHODONTICS

1. The program should run at least twenty-four continuous months and preferably thirty months.

2. An original thesis, not merely a library thesis, should be required.

3. This program would be principally for persons interested in research and teaching.

4. The research should not jeopardize the practical or theoretical programs in orthodontic training.

5. All requisites of a postgraduate program should be fulfilled as well as those mentioned above.

6. A degree of Master of Dental Science or preferably Master of Arts from the graduate school should be issued.

Respectfully submitted,

EDWARD J. FORREST
ROBERT E. MOYERS
BOYD W. TARPLEY, Chairman

SUMMARY REPORT OF THE WORKSHOP IN ORTHODONTICS HELD AT THE UNIVERSITY OF MICHIGAN, JUNE 16-21, 1958

This workshop was sponsored by the W. K. Kellogg Foundation Institute of the University of Michigan with the assistance of the Education Committee of the American Association of Orthodontists and the Great Lakes Society of Orthodontists.

The complete report will be found in *The Transactions of a Workshop in Orthodontics,* a copy of which has been deposited with the secretary of the Association.

Registrants	126
Leaders and University of Michigan staff members	58
Total	184

Study Group I: Educating the Undergraduate in Orthodontics

Moderator: Harold Noyes, Oregon
Reporter: Edward J. Forrest, Illinois
Consultants: Edward A. Cheney, Michigan
Alton W. Moore, Washington
Michigan Staff: Jack Mortell

Paper: Edward Cheney—"Aims and Objectives in Undergraduate Orthodontic Education"

Sub-Groups:
1. Objectives of undergraduate education
2. Courses of undergraduate education
3. Faculty of undergraduate education
4. Interdepartmental and student relations

Objectives: Should be able to:
1. Anticipate and detect malocclusion
2. Take steps to prevent or intercept malocclusion where possible
3. Use this knowledge as an adjunct to other phases of dental treatment

Curriculum: Designed an ideal undergraduate program

Study Group II: Educating the Specialist in Orthodontics

Moderator: Faustin Weber, Tennessee
Reporter: Z. Bernard Lloyd, Georgetown

Consultants: Frank Bowyer, American Board of Orthodontists
Tom Graber, Graduate Programs
Stephen Hopkins, Preceptorships
Shailer Peterson, Council on Dental Education
Michigan Staff: Arthur H. Craven

Papers: Stephen Hopkins—"Preceptorship Training"
Tom Graber—"An Evaluation of Graduate Training as Preparation for Specialization in Orthodontics"

1. Graduate and long-term postgraduate training (certificate)—designed an ideal program
2. Preceptorship training—designed an ideal program
3. Short courses for orthodontists—
   a. Should be conducted under auspices of a university
   b. Education Committee to keep in touch with various admissions committees as to type of courses needed; journal publicity
4. Training facilities for specialization in orthodontics—
   a. 23 graduate or postgraduate courses and 2 in Canada
   b. 187 men yearly, can be 210-213 and by 1960 will be 222-225
   c. How expanded—new schools, preceptorships, etc.
5. The man who is to be the future orthodontist—recruiting, screening, motivation, etc.
6. Elaborate data—ideal course, preceptorship program, details of each department, etc.

Study Group III: The General Practitioner and Orthodontics

Moderator: Kenneth A. Easlick, Michigan
Reporter: R. R. McIntyre, Alberta
Consultants: P. G. Anderson, Ontario
Joe Peak, Texas
Michigan Staff: John Henkel

Paper: P. G. Anderson—"The General Dental Practitioner and Orthodontics"

1. Guide to teaching interceptive orthodontic services which could be performed by dentists who are not orthodontists
2. Study clubs
3. Where to get information
4. Strong undergraduate programs

Study Group IV: Research

Moderator: Wendell Wylie, California
Reporter: Nicholas DiSalvo, New York
Consultants: Bert Kraus, Washington
Anders Lundstrom, Sweden

Michigan Staff: W. Stuart Hunter

Paper: Anders Lundstrom—"Research and Orthodontics"

1. Predictability of growth
2. Clinical investigations—methods of aiding and encouraging
3. Quality of orthodontic research and its dissemination
    a. Quality could be improved
    b. Better means of getting work being done to the profession
        i. Research journal
        ii. Exchange of theses, microfilm, etc.
        iii. Recruiting research workers
        iv. Funds—does orthodontics get its share of federal funds?
4. Funds—how to get them and where to put them
5. Motivational research—why people seek orthodontic services, attitudes of lay public to our work, etc.

Study Group V: Meeting the Demand for Orthodontic Services

Moderator: J. A. Salzmann, New York
Reporter: Herbert Margolis, Massachusetts
Consultants: Robert Grainger, Ontario
L. B. Higley, North Carolina
R. S. McMillan, Michigan
C. A. Metzner, Michigan
Jack Pelton, Washington, D. C.
Frank Popovich, Ontario
Michigan Staff: Paul Ponitz

Paper: Robert Grainger and Frank Popovich—"One Community's Orthodontic Problem"

Sub-Groups:
1. Attitudes toward orthodontics
2. Epidemiology of malocclusion
3. Distribution of orthodontic services (not orthodontists)
4. Public health orthodontic programs—purposes, success, faults, needs, foreign, etc.

Study Group VI: Relationship of Orthodontics to Other Health Services

Moderator: Maynard K. Hine, Indiana
Reporter: Samuel Hemley, New York
Consultants: Mel Cohen, Massachusetts
Emmett Costich, Michigan
Samuel Pruzansky, Illinois
Michigan Staff: William Brown
William Clauss

Paper: Samuel Pruzansky—"Orthodontics and Other Health Services" (read p. 244 preface).

1. Pedodontic-orthodontic relations
    a. referral age
    b. limitations of pedodontist
    c. inadequate records
    d. poor reporting back by orthodontist
    e. caries, etc.
2. Orthodontic-periodontic relations
    a. urged orthodontic sensitivity to periodontic problems orthodontically induced
    b. equilibration should be done by the orthodontist
    c. joint treatment by periodontist and orthodontist, rules for
3. Orthodontic-oral surgeon and orthodontic-hospital relations
    a. frenum excision, extraction of bicuspids, third molars, congenital problems; need more orthodontists on hospital staffs
4. Orthodontist as a member of a cleft palate team
    a. details of our role, organizing a team, etc.
5. Orthodontic-family physician relations

Study Group VII: Practice Management

Moderator: C. Edward Martinek, Michigan
Reporter: Leonard Sidlow, Michigan
Consultants: Ralph Campbell, Michigan
Lowrie Porter, New York
Michigan Staff: Leon Montague, Michigan

Paper: Lowrie Porter—"The Professional and Public Relations of the Orthodontist"

1. Choosing a location
2. Office design
3. Establishing fees
4. Records of caries susceptibility
5. Relations with family dentist for band removal
6. Records—estimated fees rather than total fees
7. Charges for broken and lost appliances
8. Record re use of auxiliary help
9. Caries control responsibility of family dentist, family, and orthodontist
10. Patients must come during school hours
11. Impossible to predict accurately length of treatment time
12. Associateships—three plans suggested
13. Death of an orthodontist
14. Transfer cases

ORTHODONTIC WORKSHOP
INCOME AND DISBURSEMENTS
JUNE 16-20, 1958

Income:

Tuition, 126 @ $45.00		$5,670.00
American Association of Orthodontists, Education Committee		2,250.70
Total Income		$7,920.70

Disbursements:

Honoraria	$2,300.00	
Travel and living expenses of leaders	4,204.38	
Salaries (stenographic and clerical help)	2,840.75	
Michigan Union (banquet)	499.50	
Supplies (paper, stencils, etc.)	515.46	
Long-distance telephone calls	51.15	
Assembling, binding, mailing reports	157.75	
		$10,568.99
Paid by University		$2,648.29*

ROBERT E. MOYERS

*This figure *does not include* the following:

a. Mimeographing services for daily reports and final *Transactions of the Workshop*, or the cost of all advance notices.

b. Secretarial work done by the University of Michigan personnel.

c. Services rendered by the University of Michigan staff members in orthodontics or other departments.

Publication rights for the transactions have been assigned to The C. V. Mosby Company. Any royalties which will result from sales will be deposited in the University of Michigan Dental Workshop Fund.

Department of Orthodontic Abstracts and Reviews

Edited by
DR. J. A. SALZMANN, NEW YORK CITY

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York City.

Baby Tooth Survey: Science **129**: Feb. 6, 1959.

Plans to collect 50,000 deciduous teeth yearly to provide a record of the absorption of strontium-90 by children in the St. Louis, Missouri, area have been announced by the Greater St. Louis Citizen's Committee for Nuclear Information. Parents and children in the St. Louis area are being asked to participate in this project by mailing deciduous teeth to the Baby Tooth Survey. Public interest in the strontium-90 problem in the St. Louis area has been stimulated by reports that among five areas tested, milk from the St. Louis milkshed contains the highest strontium-90 levels for 1958.

In announcing the survey, the committee cited an article that appeared in the August 2, 1958, issue of *Nature*. The article, written by Herman M. Kalckar, a biochemist at Johns Hopkins University, called for the establishment of a program of tooth collection for strontium-90 analysis throughout the world. In this article Kalckar states: "Such an International Mild Teeth Radiation Census would contribute important information concerning the amount and kind of radiation received by the most sensitive section of any population, namely, the children. At present important although rather erratic data exist, based on autopsy of bone samples derived mainly from adults."

In establishing the Baby Tooth Survey, the committee said that as far as it knows it is the first group to initiate a large-scale collection of deciduous teeth.

Your Dentist and You: By Charles M. White, New York, 1958, The American Press, 91 pages.

In this brief book of but 91 pages, the reader may find an interesting account of one dentist's view of his profession. The book is intended primarily for the lay public and should be read as such. The author can present in layman's language the point of view of the dentist, dealing with specific subjects which seem obvious to us but which elude facile explanation when the listener has not had the benefit of our experience.

Dr. White's basic point of view is entirely commendable—the relief of pain, prevention of disease, and the best possible esthetics for the individual patient. Nevertheless, he is prepared to discuss forthrightly and convincingly the economic relations between dentist and patient—the cost of equipping and maintaining a dental office, the "economic isolation" of the dentist whose practice is almost entirely independent of public facilities, and the necessity for frankness between dentist and patient. His analogy which compares preventive dentistry with fire prevention is particularly ingenious. He is quite up to date

and deals not only with "high-speed" but also mentions panographic x-ray techniques, which he providentially describes as not being practical for the typical private dental office.

Dr. White's gift for sensing what the laity should be told is particularly evident in his chapter on orthodontics. While in other portions of the book he has a great deal to say about what dentistry may do for appearance, in this chapter he stresses the aspects of prevention and health. It is as if he realized that lay people already see orthodontics in terms of esthetics and that it would be redundant to develop that aspect any further. He casts his lot with no particular camp of orthodontic controversy and even mixes "orthodontics" with "orthodontia" with fine impartiality.

The book is not without flaw. The author has an enviable knack of developing a point convincingly but, unfortunately, he has the habit of dropping one point for another just when he has hit his stride. Ninety-one pages are not overly long for a book, and had Dr, White chosen to make it a bit longer, this labor of love might have seemed less discursive. Also, he has included some lengthy quotations which impress one reader as being unnecessary diversion from the main stream of thought.

Most dentists who read the book will consider seriously the wisdom of having a copy of it available in the reception room for laymen to read. One note of caution: Dr. White will disapprove of your keeping them waiting long enough to read it clear through.

In summary, this is an entertaining statement from a man who is clearly in love with his profession, to a point where he wants to declare it from the housetops.

Wendell L. Wylie.

News and Notes

Middle Atlantic Society of Orthodontists

The next meeting of the Middle Atlantic Society of Orthodontists will be held Oct. 4 to 6, 1959, at the Shoreham Hotel in Washington, D. C. Reservations may be made directly with the hotel.

Northeastern Society of Orthodontists

The next meeting of the Northeastern Society of Orthodontists will be held at the Hotel Statler in Hartford, Connecticut, on Monday and Tuesday, Oct. 26 and 27, 1959.

The newly elected officers of the Northeastern Society are as follows:

President, Wilbur J. Prezzano
President-Elect, Henry C. Beebe
Vice-President, Irving Grenadier
Secretary-Treasurer, David Mossberg
Director to A. A. O. (2 years), Norman L. Hillyer
Alternate Director (2 years), Richard Lowy
Sectional Editor, Joseph D. Eby
Assistant Editor, Brainerd F. Swain
Historian, Leuman M. Waugh

Southern Society of Orthodontists

The Southern Society of Orthodontists will hold its thirty-eighth annual session at the Dinkler Plaza Hotel in Atlanta, Georgia, Oct. 11 to 14, 1959. The program follows:

Sunday Afternoon, October 11

Cocktail party.

Monday Morning

Opening Session Essays by Drs. George Anderson, President of the American Association of Orthodontists, and Tom Graber.

Monday Afternoon

Essays by Drs. Earl Shepard and Herbert D. Jaynes.

Monday Evening

Cocktail party.
Banquet.
Floor show.
Dancing.

Tuesday Morning

Second lecture by Dr. Earl Shepard.
Business session.

AMERICAN BOARD OF ORTHODONTICS

Tuesday Noon

Luncheon honoring new members.
Speaker: George Anderson.

Tuesday Afternoon

Table clinics.

Wednesday Morning

Economics. Speaker: Mr. Jules King.
Business session.
Adjournment.

Visiting members of the American Association of Orthodontists will be welcome.

LADIES' ACTIVITIES

Co-Chairmen: Kay Smith and Nancy Upshaw (All wives are committee members)

Monday Morning, 9:30 A.M.

"Welcome South Sisters Breakfast" at Dinkler Plaza.
Business meeting follows.

Tuesday, Noon

Luncheon, Flower and Fashion Show at Piedmont Driving Club.

American Board of Orthodontics

The American Board of Orthodontics held its annual five-day meeting April 28 through May 2, 1959, for the purpose of conducting routine business and examining candidates aspiring to certification.

The unanimous choice for the new director to be appointed to the Board was Dr. Alton W. Moore of Seattle, Washington. Dr. Moore replaces Dr. William R. Humphrey, whose term of office expired at the time of the Detroit meeting and who served as president of the Board during his final year of service and as vice-president the year before.

In the final session the Board adopted by acclamation the following tribute:

> As we adjourn our 1959 session the American Board of Orthodontics wishes to record in its minutes an expression of the affectionate regard we hold for our retiring President, Dr. William R. Humphrey. We have admired his view of the over-all purposes of the Board and enjoyed his companionship. His demeanor toward candidates has conveyed to them our concern for their well-being, and we shall miss his presence in future sessions.

Certification was granted to thirty-one candidates as follows:

Eugene Earl Atlas
Wallace Henderson Black
William Campbell Crockatt
LeGrand Raine Curtis
Edward J. Forrest
George Forrest
Donald Henry Glew
Alexander Goldenberg
Edward Mason Griffin
John Bright Hopkins
Matthew Malach Kaufman
Solomon Jerome Kessler
Donald H. Ketterhagen
William Alkaid King
Robert Francis Lande
Ivan Fall Lee
Bernard David Lefrak
J. Rodney Mathews
Milton Neger
Archie Elwood Peterson
Peter Julius Picard
Erman D. Rauch
James M. Reynolds
Robert Murray Ricketts
Leonard J. Seide
Abraham Silverstein
J. Byron Smith
Jack R. Smithers
Paul Howard Stephens
Jack McKim Vorhies
Maurice R. Zingeser

The next meeting of the American Board of Orthodontics will be held at the Shoreham Hotel in Washington, D. C., Monday, April 18, through Saturday, April 23, 1960. Orthodontists who desire to be certified by the Board may obtain application blanks from the Secretary, Dr. Wendell L. Wylie, University of California School of Dentistry, The Medical Center, San Francisco 22, California.

Applications for acceptance at the Washington, D. C., meeting, leading to stipulation of examination requirements for the following year, must be filed before March 1, 1960. To be eligible, an applicant must have been an *active* member of the American Association of Orthodontists for at least two years.

Denver Summer Seminar

The program for the Denver Summer Seminar, which will be held at Writer's Manor in Denver, Colorado, Aug. 2 to 7, 1959, has been announced. The following will be featured:

Samuel Davis Gore, D.D.S., F.I.C.D., F.A.C.D., New Orleans, Louisiana, Associate Professor of Orthodontics at the University of Alabama School of Dentistry.

Topics of Discussion:

History of the Precious Metal Removable Appliance. (Preparation of models, trimming of teeth to correct anatomic form for clasps, and construction of the appliance will be discussed and illustrated by slides.)

Psychological Preparation of the Patient for Wearing Removable Appliances—Advantages and Disadvantages in Their Use. (Instructions to the patient on care of appliances, again stressing the importance of cooperation. Treatment of cases illustrated by slides.)

Treatment of cases continued with emphasis on treatment in deciduous dentition.

Table clinic showing auxiliary attachments and adjustment of appliances for various tooth movements.

Dr. Nathan Kohn, Jr., St. Louis, Missouri.

Topics of Discussion: (To be announced.)

Harry Sicher, M.D., D.Sc., Professor and Head of Department of Anatomy, Loyola University, Dental School, Chicago, Illinois.

Topics of Discussion:

Growth of Skull and Face.
General Principles of Skeletal Growth.
Methods of Investigation and Their Limitations.
Biologic Consideration of Cranial and Mandibular Growth.
Outlook to Etiology of Malocclusions.

Entertainment has not been neglected. This consists of the annual supper on the evening of August 2 for all in attendance. Members of the twenty-second annual meeting and their families will enjoy famous old Central City and dinner at the historic Teller House, followed by a play in the Opera House, on Tuesday evening.

Please make hotel reservations directly with Writer's Manor, 1730 S. Colorado Blvd., Denver, Colorado. Mention that you are with the Denver Summer Meeting, as a block of rooms are reserved for our group. It is the opinion of the Board of Trustees that Writer's Manor will afford the finest of accommodations, as it has in the past. It has a variety of eating places, excellent food, air conditioning, a swimming pool, and a minimum of noise.

A printed program will be mailed at a later date to those sending in applications, indicating attendance. A fee of $30.00 is requested with your application. Should you be unable to attend, this fee will apply to the purchase of a book containing the full proceedings of the meeting.

Attendance is limited, and applications will be given preference in the order of their return.

ELI H. MULLINAX, Secretary
8790 West Colfax Ave.
Denver 15, Colorado

Army and Air Force Dental Bills Now in Both Houses of Congress; New Measures Would Give Profession Control Over Dental Programs*

Bills designed to give greater independence in administration to the Army and Air Force dental services were in the U. S. Senate this week following the introduction of similar measures in the House of Representatives. Legislation to correst inadequacies in the two services has long been sought by the A. D. A. The Senate bills (S. 1993 and S. 1994) were presented May 19 by Sen. Jackson (D., Wash.) and are similar to the Army and Air Force dental bills (H. R. 5984 and H. R. 5985) that were introduced in the House on March 24 by Rep. Rivers (D., S. C.). It was Rep. Rivers who in 1945 sponsored legislation that set up the present administrative status of the Navy Dental Corps. The new bills for the Army and Air Force, by giving dental officers in the two services more authority for administrative decisions involving professional services, would help to assure the highest quality of dental care to military personnel. The efficiency of dental practice in the two services would also be aided by improved morale of dental officers and the probabilities of lessened turnover of dental manpower in the Army and Air Force. One purpose of the bills would be to meet the need for the senior dental officer at any major installation to be responsible directly to the commanding officer for operation of the dental service. "By giving greater responsibility and control to the two dental corps, many of the inadequacies that exist would be corrected on a permanent basis," Dr. Ralph E. Creig, of Cleveland, chairman of the A. D. A. Council on Legislation, said.

Strong Support for Self-Employed Retirement Plan Given in Senate*

Strong support for the proposal to permit limited tax deferrals on income of self-employed persons to set up retirement programs came May 19 in the U. S. Senate. The new support was given by Sen. Smathers (D., Fla.) who introduced his own bill which is almost identical to the Keogh-Simpson bill as passed by the House of Representatives on March 16. The new bill was referred to the Senate Finance Committee of which Sen. Smathers is a key member. He is also chairman of the Democratic Senatorial Campaign Committee. The Smathers bill differs from the Keogh-Simpson measure only in the date of effectiveness of the plan, which is set at 1961 rather than upon the date of enactment. In presenting the bill, Sen. Smathers said: "Millions of our self-employed citizens today are looking to this Congress to give to them the equivalent tax treatment which others are presently enjoying so that they too may be able to provide for the twilight years of their lives." Similar measures were presented earlier in the Senate by Sen. Morton (R., Ky.), new chairman of the Republican National Committee, and Sen. Kefauver (D., Tenn.). The A. D. A. is a charter member of the American Thrift Assembly which is urging enactment of the program.

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*From the A. D. A. *News Letter*, June 1, 1959.

Lack of Regimentation a Factor in World Leadership of U. S. Dentistry, Dr. Hillenbrand Tells A. D. T. A.*

The dental profession of the United States, marking the 100th anniversary this year of the A. D. A., has achieved world leadership in part because "Americans increasingly over the years have wanted a higher standard of health to be a part of a higher standard of living," Dr. Harold Hillenbrand, of Chicago, Association secretary, told the American Dental Trade Association May 28 at its annual meeting in Hollywood Beach, Fla. As one reason for the outstanding development of the profession in the United States, Dr. Hillenbrand pointed to the absence of government regimentation of the health sciences. He said:

> This is not to say that government does not have a proper role in protecting and safeguarding the health of all its citizens, for it does. This is to say, however, that as, in many countries, the intervention of government can proceed to the point where progress is halted under the great pressures of conformance, cost, size and politics.

Dr. Hillenbrand cited the National Health Service scheme in Great Britain as an example of wide government control. In 10 years of the plan, he said, one new hospital has been built while in the United States in the last six years, 7,000 hospital beds have been added. "The answer is not governmental intervention but strong voluntary programs with governmental assistance through states and communities," he said. Dr. Hillenbrand noted that the dental profession depends on a work force of nearly 200,000 people. "A strong profession depends on a strong trade industry and on well-trained auxiliaries," he said.

American Dental Association Forum on Orthodontics

A forum on orthodontics will be presented at the annual meeting of the American Dental Association in New York City Sept. 14 to 18, 1959. The forum will be under the direction of Dr. William R. Root, chairman of the Orthodontic Section. The program follows.

DIAGNOSIS

(Monday, September 14. Harry D. Spangenberg, Jr., Presiding)

Panel Discussion: Diagnosis of Difficult Cases.

Moderator: LeRoy Ennis, Philadelphia, Pennsylvania.

Panelists: H. Stones, Liverpool, England.
A. Benagiano, Rome, Italy.
J. J. Pindborg, Copenhagen, Denmark.

ORTHODONTICS

(Tuesday, September 15. William R. Root, presiding)

Individual Essays:

Serial Extraction as Treatment Procedure.
Z. Bernard Lloyd, Washington, D. C.

Supernumerary and Congenitally Missing Teeth.
Frank P. Gilley, Bangor, Maine.

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*From the A. D. A. *News Letter*, June 1, 1959.

Deaths of Two Orthodontists

Shortly before the JOURNAL went to press, we learned of the deaths of two orthodontists—Archie Brusse of Denver, Colorado, and Bernard Lloyd of Washington, D. C. Obituaries will be published at a later date.

Notes of Interest

Samuel Ackerman, D.D.S., 19 Garfield Pl., Cincinnati, Ohio, announces the association of Bernard Joffin, D.D.S., in the practice of orthodontics.

Dr. James G. Coyle announces the opening of his offices at 90 Main St., Port Washington, New York, and Huntington Medical Building, East Pulaski Rd., Huntington, New York, practice limited to orthodontics.

Dr. Raymond M. Curtner, 450 Sutter St., San Francisco, California, is pleased to announce the association of Dr. James W. Reese, a graduate of the orthodontic curriculum at the University of Michigan, in his orthodontic practice.

Thomas Edblom, D.D.S., M.S.D., announces the opening of his office for the practice of orthodontics at 700 Medical Arts Bldg., Minneapolis, Minnesota.

David H. Katz, D.D.S., announces the opening of his office for the practice of orthodontics at 2 Stratford Rd., Plainview, Long Island, New York.

Dr. Richard J. Muir announces the opening of his office for the practice of orthodontics at 1017 Mission, Rigg, Santa Cruz, California.

R. W. Ramming, Jr., announces the opening of his office at 2201 Brook St., Wichita Falls, Texas, for the practice of orthodontics.

George J. Sullivan, D.M.D., announces the opening of his office for the practice of orthodontics in the Parkside Building, 4140 Shelbyville Rd., Louisville, Kentucky.

Forthcoming meetings of the American Association of Orthodontists:
1960—Shoreham Hotel, Washington, D. C., April 24 to 28.
1961—Denver, Colorado.
1962—Los Angeles, California.
1963—American Hotel, Miami Beach, Florida.

OFFICERS OF ORTHODONTIC SOCIETIES

The AMERICAN JOURNAL OF ORTHODONTICS is the official publication of the American Association of Orthodontists and its component societies. The Editorial Board of the JOURNAL is composed of a representative of each of the component societies.

American Association of Orthodontists

(Next meeting April 24-28, 1960, Washington)

President, George M. Anderson - - - - - - - - - - - - 3700 N. Charles St., Baltimore Md.
President-Elect, William R. Humphrey - - - - - - - - - - - Republic Bldg., Denver, Colo.
Vice-President, Frank A. Heimlich - - - - - - - - 1824 State St., Santa Barbara, Calif.
Secretary, Earl E. Shepard - - - - - - - - - - - - - 8230 Forsyth, St. Louis, Mo.

Central Section of the American Association of Orthodontists

(Next meeting Sept. 28 and 29, 1959, Chicago)

President, John R. Thompson - - - - - - - - - 55 E. Washington St., Chicago, Ill.
Secretary-Treasurer, William F. Ford - - - - - - - 575 Lincoln Ave., Winnetka, Ill.
Director, Elmer F. Bay - - - - - - - - - - 216 Medical Arts Bldg., Omaha, Neb.

Great Lakes Society of Orthodontists

(Next meeting Nov. 29-Dec. 2, 1959, Cleveland)

President, Richard C. Beatty - - - - - - - - - - - 1140 Hanna Bldg., Cleveland, Ohio
Secretary, D. C. Miller - - - - - - - - - - - - 40 South Third St., Columbus, Ohio
Director, Harlow L. Shehan - - - - - - - 601 Jackson City Bank Bldg., Jackson, Mich.

Middle Atlantic Society of Orthodontists

(Next meeting Oct. 4-6, 1959, Washington)

President, Stephen C. Hopkins, Sr. - - - - - 1746 K St., N. W., Washington, D. C.
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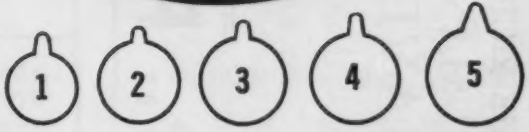

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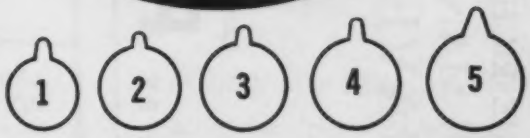

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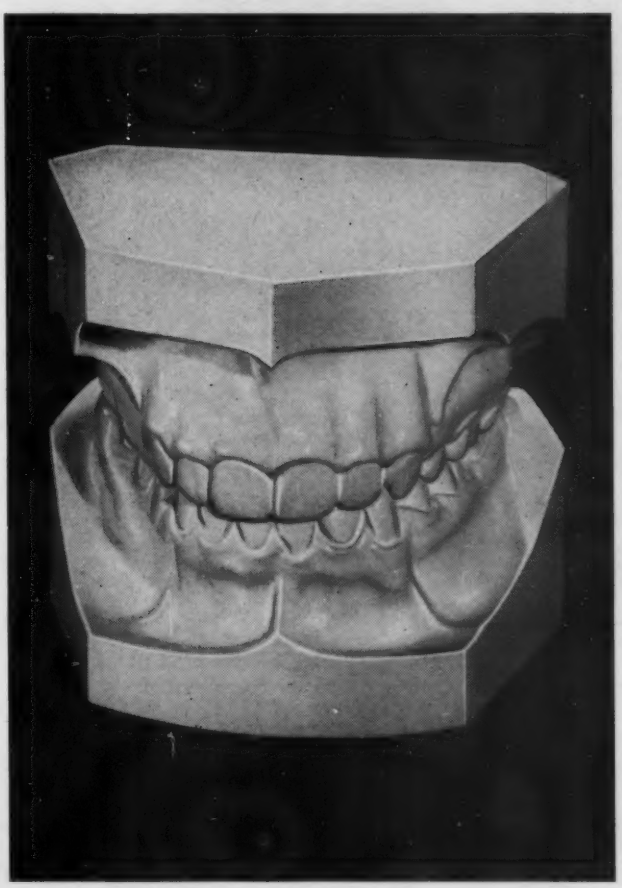

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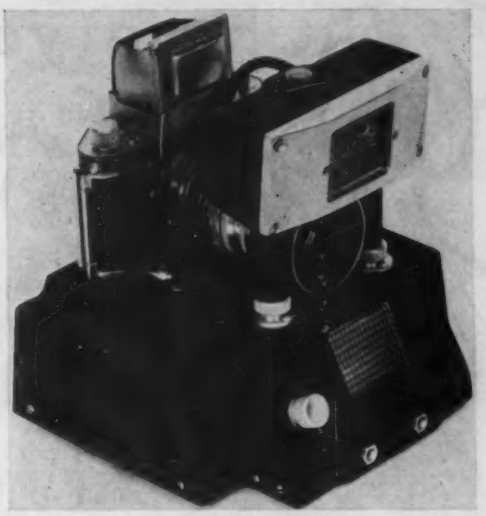

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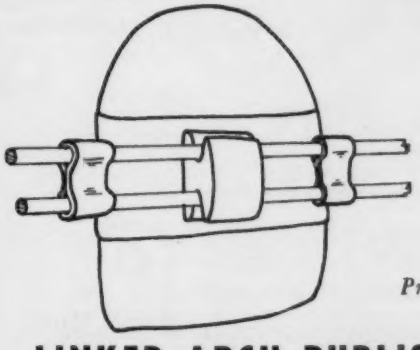

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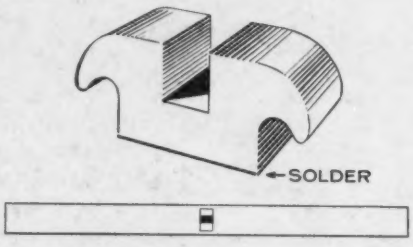

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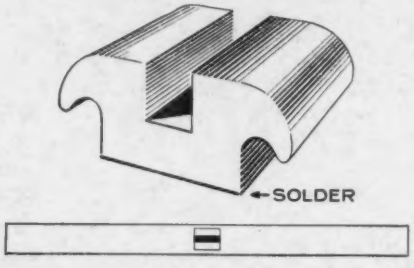

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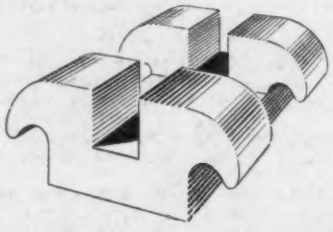

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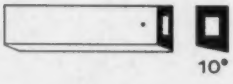
Anchor Tubes

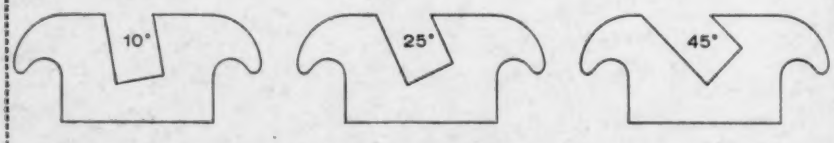
M 474



Metalba* Anchor Tubes for use in connection with Torque Slot Edgewise Brackets. They are ¼ inch long, rectangular tubes, with a bore of .022 x .028. The side of the tube which is to be soldered to the band has a 10 degree angle to permit it to fit into the Torque Slot Bracket assembly.

*METALBA—platinum color, precious metal.

Torque slot, Divided Triple-width Edgewise Brackets



The angle of the wire slot in the Bracket gives direction to the Torque force of arch wire.

M 516	Torque 10°	Width	.140 inches
M 517	Torque 10°	Width	.180 inches
M 518	Torque 25°	Width	.180 inches
M 519	Torque 45°	Width	.180 inches

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